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ABSTRACT

This study presents a descriptive overview of 20 alternative certification and retraining programs and reports on 10 of them in depth. Specific questions addressed in the study include: (1) What are the characteristics of individuals being attracted to such programs and of the programs themselves? (2) How successful are programs in preparing teachers, particularly for math and science classrooms? (3) What are participants' career goals and how successful are they in finding permanent teaching positions? and (4) What are the perceptions of current faculty and administrators regarding alternative certification and retraining? These questions were explored principally through analysis of data collected in telephone interviews with program administrators, program participants and their supervisors, and traditionally prepared teachers who had contact with the participants. Documents provided by the program were also examined. Appendices include a list of study methods, descriptions of 10 programs, overviews of supplementary sample of programs, and an annotated bibliography of over 50 items. (JD)

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AN EXPLORATORY STUDY OF TEACHER ALTERNATIVE CERTIFICATION AND RETRAINING PROGRAMS

Nancy E. Adelman

with the assistance of
Joan Michie and
Joanne Bogart

October 1986

Policy Studies Associates, Inc.

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AN EXPLORATORY STUDY OF TEACHER ALTERNATIVE CERTIFICATION AND RETRAINING PROGRAMS

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October 1986

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PREFACE

This report describes selected alternative certification and retraining programs for teachers. The data come from telephone interviews with administrators and participants in 20 programs. This research was conducted in conjunction with another study whose findings are published in a separate report (Ellen L. Marks, "Title II of the Education for Economic Security Act: An Analysis of First-Year Operations," Policy Studies Associates, Washington, D.C., October 1986).

The research was supported by the U.S. Department of Education (ED) under contract number 300-85-0103. It was performed for the State and Local Grants Division, Office of Planning, Budget, and Evaluation by Policy Studies Associates' Data Analysis Support Center (DASC). The DASC provides support services in the form of background information for the work of ED staff as they assess (1) the effects of federal actions on state and local operations, (2) methods for improving intergovernmental relations, and (3) the effectiveness of federal programs in serving national priority groups.

The report is intended for federal policymakers. It contains information that may be useful to state and local policymakers and educators.

ACKNOWLEDGMENTS

This report is the result of conversations with many people who gave freely of their time to help us form a clear picture of the current status of teacher alternative certification and retraining programs. We would like to first express our thanks to the administrators of the programs we describe in the report. They were thoughtful, candid, and patient with our questions in every instance. Second, we are grateful to the many program participants, supervisors, and teachers who were willing to take time away from their summer plans to talk with us about their experiences with the programs. Third, Carol Chelemer, our project officer in the U.S. Education Department, provided extremely useful guidance throughout the project, particularly in helping us to focus the context in which the study should be set.

The study team included Nancy Adelman and Joanne Bogart of Policy Studies Associates and Joan Michie, an independent educational consultant. Brenda Turnbull of Policy Studies Associates provided invaluable editorial advice. Cecilia Iglesias prepared the manuscript. Marilyn Cohn, Director of Teacher Education at Washington University in St. Louis, served as a special consultant in the early stages of the project and prepared an annotated bibliography on the evaluation of teaching and the socialization of new teachers into the profession.

EXECUTIVE SUMMARY

Because of concerns about the supply and quality of American teachers, special types of teacher training programs have been developed by states, localities, and institutions of higher education. One such strategy is alternative certification--programs designed to attract and prepare college educated but uncertified individuals for the teaching profession. A second strategy is retraining--programs that address particular state and local teacher recruitment needs by preparing fully certified teachers for recertification in a new field.

Alternative certification and retraining programs have developed within the context of broader national questions about the selection and preparation of teachers and the status of the teaching profession. The National Commission on Excellence's A Nation at Risk and numerous other recent assessments of American education have suggested that: (1) the academic achievement gap between education majors and non-education majors is significant; (2) the content and structure of teacher education programs need to be reconsidered; and (3) certain fields, such as math and science, have critical shortages of qualified personnel.

During the past year, long range proposals to restructure the teaching profession have emerged. The Holmes group suggested the abolition of undergraduate teacher education and proposed instead a three tier hierarchical professional structure with advancement based on graduate study and other gatekeeping procedures. The first tier would be essentially a post-baccalaureate apprenticeship period that, as described, appears to be very similar to the field experiences associated with many alternative certification programs. The Carnegie Forum on Education and the Economy, best known for its proposed independent national teacher certification board, also suggested a master's level teacher preparation program that is longer than but similar to some alternative certification programs. Both initiatives are being actively pursued. However, implementation of large scale reform is likely to take some time.

While the debate goes on, alternative certification and retraining programs are already serving more immediate state or local school staffing needs. At least 18 states now allow alternate routes to a teaching certificate. Part of the programs' importance lies in their potential value to policymakers as laboratories for innovative methods in the recruitment, selection, and training of competent teachers for American schools. They are thus addressing both short term local goals and longer range policy issues regarding teacher quality and quantity.

Purposes of the Study

This study presents a descriptive overview of 20 alternative certification and retraining programs and reports on 10 of them indepth. It is exploratory in nature. While we do not know how representative they are of the range of existing alternative certification and retraining models, they do provide an important initial examination of an area that has not been studied.

Specific questions addressed in the study include: (1) What are the characteristics of individuals being attracted to such programs and of the programs themselves? (2) How successful are programs in preparing teachers, particularly for math and science classrooms? (3) What are participants' career goals and how successful are they in finding permanent teaching positions? and (4) What are the perceptions of current faculty and administrators regarding alternative certification and retraining?

These questions were explored principally through analysis of data collected in telephone interviews with program administrators, program participants and their supervisors, and traditionally prepared teachers who had contact with the participants. Documents provided by the programs were also examined.

STUDY FINDINGS

The major findings of the study pertain to (1) characteristics of participants in teacher alternative certification and retraining programs; (2) characteristics of the programs themselves; and (3) the results of the programs.

- Alternative certification programs appear to be attracting well-educated individuals with a sincere interest in teaching. Math and science retraining programs appear to attract teachers who feel they are "burning out" in their present area of teaching or teachers in oversupplied fields who seek greater job security.

  Alternative Certification Programs

  - Many individuals attracted to alternate certification programs appear to have superior educational backgrounds. Participants include recent college graduates, persons seeking a mid-career change, former instructors in other kinds of educational enterprises, and homemakers.

  - Participants' previous job experiences are diverse, but the majority of this sample had engaged in some type of instructional activity at some point prior to entering an alternative certification program.

  - The most common reason given for enrolling in an alternative certification program is a personal commitment to go into teaching at some time.

  Retraining Programs

  - Retraining candidates tend to be 10-15 year veterans of teaching.

- Teachers seek retraining either because they find themselves stagnating in their current fields or because they view their current positions as insecure.

- In comparison with traditional teacher education programs, alternative certification programs feature more field experience and more intense supervision in the field. Formal coursework is a compressed version of traditional teacher education. Retraining programs facilitate the late acquisition of a second undergraduate college major, usually in math or one of the sciences. Their content and structure vary, reflecting the diversity of both the institutions providing the instruction and state certification requirements.

  Alternative Certification Programs

  - Alternative certification programs are selective and base admission on criteria such as undergraduate grade point average, essays, previous job experiences, and interviews.

  - Within a compressed time frame, formal instruction in alternative certification programs generally covers areas characteristic of an undergraduate teacher education program: pedagogical/methodological knowledge and skills, human growth and development, and an overview of the philosophy and history of American education.

  - The field experiences range from something approximating extended student teaching to full time, paid responsibility for a classroom.

  - Supervision of program participants, particularly during the early weeks of the field experience, is more intense than that associated with the typical teacher education program. Effective supervision is reported to be particularly critical to the success of these programs.

  - A schedule that requires alternative certification candidates to undertake full time teaching responsibility and attend formal instruction after work is highly stressful.

  - The "group feeling" associated with being part of a special program is an important factor in helping participants weather stressful periods.

  - Alternate route candidates had the most difficulty with classroom management skills, not unlike traditionally trained beginning teachers.

  Retraining Programs

  - Retraining programs also have application and admission procedures, usually involving undergraduate transcripts and

local school district recommendations. They draw on a more limited applicant pool than alternative certification programs and appear to be somewhat less selective.

- Retraining programs focus on subject matter instruction in math and science. Courses offered are at the undergraduate level and may be either special sections of regularly offered classes or special curricula adapted for adult learners.

- The amount of coursework required of individuals in retraining programs depends on state or local certification standards for math or science teachers and on evaluation of each participant's undergraduate transcript.

- Courses are taught by college professors or secondary level master teachers. Retrainees cite the combination of these two types of instructors as preferable.

- Provision of tutorials or special assistance workshops is helpful to retrainees.

- Alternative certification programs produce subject area-proficient teachers who are also rated highly on instructional skills in comparison with traditionally prepared beginning teachers. Retraining programs appear to successfully prepare some experienced teachers for math and science classrooms, but there are indications that many program completers do not end up teaching math and science.

Alternative Certification Programs

- Supervisors of alternative certification candidates in the sample universally judged them above average in subject matter preparation.

- Fourteen of 16 alternative certification candidates were rated superior or above average in overall comparisons with traditionally trained student or beginning teachers.

- All alternatively certified teachers interviewed intend to pursue their new career. Placements for school year 1986-87 were not assured at the time of the interviews, but it is likely that all will be teaching.

- While traditionally trained teachers interviewed were supportive of alternative certification programs, several alternative certification program participants reported negative responses from colleagues in their own schools or in schools where peers were placed. Supervisors also described hostile or cynical reactions to the programs among some of their colleagues.

Retraining Programs

- College or university-based instructors varied in their opinions of the average retrainee's capability to master the necessary content in a new field. In one program, instructors' negative opinions caused significant attrition among participants.

- Retrainees receive little classroom supervision as they take on new assignments. As a result, little information is available on their competence to teach in a new subject area.

- Retrainees do not always seek or find immediate employment in the area for which they are newly certified. Some choose not to teach math or science. Others are unable to find positions.

- Traditionally certified teachers in math and science do not appear to object to the retraining of experienced teachers for new fields.

Overall, the study found alternative certification programs to be responsible and innovative approaches to addressing local and state issues of teacher supply and quality. The retraining programs studied, which were exclusively focused on preparing science and math teachers, seemed to provide adequate background in those content areas. However, there appears to be the need for better articulation between retraining programs and the local school districts they serve.

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I. INTRODUCTION

This study is a preliminary examination of the status and effectiveness of teacher retraining and alternative certification programs. It addresses several questions about what the programs do, who enrolls in them, and their results. Specific research objectives include:

(1) detailed descriptions of a sample of seven alternative certification and three retraining programs;

(2) identification of the characteristics of individuals being attracted to these programs;

(3) an informal assessment of the adequacy of such programs in preparing teachers, particularly for math and science classrooms;

(4) information on whether alternatively certified teachers are likely to remain in teaching and whether retrained teachers find placements in the field for which they have been retrained;

(5) information on the perceptions of current faculty and administrators about nontraditional routes to certification.

This introductory chapter defines the terms "alternative certification" and "retraining," discusses the reasons for establishing such programs, and outlines the methods of this study.

What Are Alternative Certification and Retraining Programs?

The term "alternative certification" is a fairly recent addition to the vocabulary of educators. In general, it refers to proposals and programs designed to tap new pools of college educated, non-education majors for the teaching profession. During the relatively brief period that the term has been in use, it has acquired some negative connotations, especially among teacher educators. The principal source of their concern has been that state actions authorizing alternative certification have emphasized "shortcuts,"

particularly regarding the pedagogical and methodological aspects of traditional teacher preparation.

The American Association of Colleges of Teacher Education (AACTE) issued a position statement on alternative certification in February 1985 advocating that alternative teacher preparation programs (1) use selective admission standards, (2) employ a curriculum that provides the knowledge and skills needed by beginning teachers, (3) incorporate a supervised internship, and (4) assure competency in the subject field and in professional studies through use of an examination.

For the purposes of initial identification of alternative certification programs for this study, we have employed the following broad definition:

> Alternative certification programs are those teacher preparation programs that enroll noncertified individuals with at least a bachelor's degree, offering shortcuts, special assistance, or unique curricula leading to eligibility for a standard teaching credential.

This definition casts a wide net and allows the inclusion of both more and less rigorous alternative preparation programs. In fact, all the alternative certification programs selected for in-depth study have selective admission procedures and offer both formal coursework and an internship. They thus meet three of the four criteria suggested by the AACTE. Not all programs (or the states in which they are located) require a qualifying or competency examination for certification.

Retraining programs are more simply and less controversially defined. They are programs that offer fully certified teachers the opportunity to obtain the necessary training for recertification in a different area or field of teaching. In general, retraining programs have been developed to address state or local needs for teachers in particular fields, notably math and science.

Why Have Alternative Certification and Retraining Programs Been Established?

In our initial search for operating alternative certification and retraining programs, we followed many leads before settling on the 20 in the sample. The term "sample" in this case means only that the programs we identified are some proportion of the total number in existence. The size of the universe remains an unknown. We found that a number of states and localities are currently at the discussion or initial implementation stages of such initiatives. Others are intrigued but have adopted a "wait and see" attitude. There is no question that there is a strong interest in nontraditional approaches to teacher certification and retraining among states, institutions of higher education, and local school districts. It was our distinct impression that developments in this area have not yet peaked.

The current enthusiasm for alternative certification and retraining programs is attributable to two principal causes: (1) actual or anticipated teacher shortages at state and local levels and (2) concern about the quality of the teaching force. Both of these issues have been highlighted in a series of widely publicized reports that began with the National Commission on Excellence in Education's A Nation at Risk (1983) and culminated recently in the Carnegie Forum on Education and the Economy's A Nation Prepared: Teachers for the 21st Century (1986).

The National Commission found that (1) too many of the college students being attracted to teaching were in the bottom quarter of graduating high school and college students; (2) teacher education programs focused heavily on "methods" courses at the expense of training in the subjects to be taught; and (3) severe teacher shortages existed in the fields of math, science, foreign languages, bilingual education, and special education. The Commission's recommendations for addressing these problems included higher standards for

teacher preparation programs, provision of incentives (such as grants and loans) to attract higher quality teacher candidates, and the establishment of special means for quickly staffing shortage areas such as math and science classrooms with recent graduates, retired scientists, and others with appropriate subject matter expertise.

A Nation at Risk validated and gave prominence to a reported crisis in the quality and quantity of teachers. Throughout the 1970s, reports that the market for teachers at all levels was saturated circulated through institutions of higher education. Many college students who originally thought that they might major in an academic discipline such as biology, math, or English and would therefore have been potential secondary school teachers instead turned in droves to business and technology career paths. The number of elementary and secondary education majors dropped sharply. In 1971, more than 20 percent of all bachelor's degrees conferred were in education. In 1981, the figure was less than 14 percent (NCES, 1985).

Suddenly, in the early 1980s, surveys indicated that there was a serious and growing shortage of math and science teachers (Shymansky and Aldridge, 1981; Howe and Gerlovich, 1982). At about the same time, the National Academy of Sciences sponsored a symposium where the quality of math and science education in the nation's schools was called into question (National Academy of Sciences, 1982), and the National Science Foundation established a Commission on Precollege Education in Mathematics, Science and Technology to address issues related to the crisis.

National forums such as those cited above gave particular visibility to problems associated with the quality and quantity of math and science teachers. However, other well-publicized reports (Boyer, 1983; Goodlad, 1984; Sizer, 1985) questioned the quality of secondary school teaching overall. The

result has been a flurry of activity at the national, state, and local levels directed at improving teacher education and upgrading the teaching profession. Alternative certification and retraining programs are part of the response--perhaps an interim response until sweeping structural changes appear in the profession, such as the hierarchical structure proposed by the Holmes group and/or the independent national certification board being explored by the Carnegie Forum's Task Force on Teaching as a Profession. Alternative certification programs are making a concerted attempt to attract different but well-educated subject matter specialists to teaching, particularly but not exclusively in the fields of math and science. Retraining programs are attempting to keep experienced teachers in the profession, address the problem of teacher misassignment, and meet staffing needs by offering opportunities to expand the areas in which an individual is qualified to teach.

What Is the Evidence for the Crisis in Teacher Quality and Quantity?

Are alternative certification and retraining programs responding to a real crisis? Virtually all recent syntheses of the available data on who is going into teaching agree that the evidence points to a decline in the quality of potential teachers since the 1960s (Darling-Hammond, 1984; NIE, 1984; Blank and Raizen, 1985; Feistritzer, 1985; Carnegie Forum on Education and the Economy, 1986). Data typically cited to support this argument include comparison of SAT scores for all college-bound students with those of intended education majors over the past decade and the increasing number of potential teachers from high school general and vocational programs rather than the academic track. Another frequently quoted study indicates that the most able teachers may not stay in the profession long, although this is not particularly a phenomenon unique to the 1980s (Schlecty and Vance, 1981).

Why are highly able people not electing to teach? Reports such as those referred to above most often suggest reasons that include the increase in employment opportunities open to women, who have traditionally staffed the majority of the nation's classrooms, the generally poor image of the teaching profession and its low salaries, and, for potential math and science teachers of either sex, the growth of high-paying jobs in technology.

How severe the teacher shortage is (or may become) is not clearcut. In terms of national estimates of teacher supply and demand, the U.S. Department of Education projects an increasing gap between the number of newly qualified teacher graduates, as reported by its annual survey of "Earned Degrees Conferred," and the need for new or replacement teachers. By 1993 the supply may be as low as 63 percent of demand (NCES, 1985). Because of the so-called baby boomlet, much of the need for new teachers through this period is expected to be at the elementary school level.

The 1983 figures from ED's "Survey of Teacher Demand and Shortage" indicate that a sample of public and private schools nationwide reported a shortfall of about 4,000 teachers. The greatest number of openings was reported in special education (1,030), followed by elementary (740), bilingual (260), and math (260). In this survey, only 180 unfilled teaching slots in the biological and physical sciences were reported by the 3,072 responding local educational agencies (LEAs) and private schools. These are not overwhelming numbers.

National sample data do not, however, necessarily reflect local situations. News dailies reported extensively in the spring of 1986 on the lengths to which local school districts were going to attract new teacher graduates, with incentives such as a downpayment on a new car, a month's free rent, and dollars-off coupons at local businesses and restaurants. States also continue

to propose or implement new reforms that potentially affect the demand for teachers. For example, a commission in Virginia has recently recommended that the student/teacher ratio in all secondary level English courses be reduced to 18:1 by the year 2000--a measure that would call for a significant increase in the number of teachers in that field.

Central cities have chronic shortages in all fields and at all levels. According to ED, the Los Angeles Unified School District alone reportedly accounts for more than half the teacher shortages in the western region and one-fourth of all shortages in the nation. An NEA-sponsored June 1986 survey of the nation's 100 largest school districts found 32,300 teacher vacancies. (Education Week, September 10, 1986). Small high schools in rural districts frequently are unable to recruit teachers qualified to teach upper level math and science classes. Those classes, therefore, are simply not included in the curriculum offerings.

Two practices that affect both the teacher shortage statistics and the quality of teaching are the use of emergency certification and out-of-field teachers to fill gaps in staffing. Emergency credentials are generally issued by state teacher certification offices, at the request of LEAs, for a period of one to three years, during which time the holder may obtain the necessary background for standard certification. Many teachers who are now fully certified entered the profession in this way. There is evidence, however, that emergency certification is subject to abuse. New Jersey recently disallowed emergency credentials, in part because some districts were making little effort to recruit and hire fully qualified and available teachers in the state.

Another method that school districts use to meet shortages is assignment of teachers certified in one area to classes in another field. A biology

teacher might be given two sections of chemistry or an English teacher might be loaned to the social studies department. The National Science Teachers Association has recently acknowledged the prevalence of this system of teacher assignments and is suggesting that science teachers be prepared as generalists, equipped to cover all or most topics in the elementary and secondary curricula (Education Week, Sept. 24, 1986).

As with the national figures on teacher shortages, estimates of the proportion of instructors teaching out-of-field are variable. The Council for Basic Education (CBE) and the American Federation of Teachers (AFT) surveyed the 50 states in 1983 and estimated that as many as 200,000 U.S. teachers--approximately 10 percent of the total--were teaching out-of-field (Council for Basic Education, 1985). On the other hand, the U.S. Department of Education found that in 1983, 1.6 percent of all public school teachers were either uncertified or teaching out-of-field. According to ED, percentages were significantly higher in bilingual education, computer science, special education, and vocational education. The more disturbing evidence from this survey, however, concerned the number of newly hired teachers who fell in the category. Nearly 9 percent of new hires in 1983 were uncertified for their field of assignment--a figure comparable to the CBE-AFT estimate. The northeastern and southern states, central cities, and large districts used the highest proportions of emergency certified or out-of-field teachers (NCES, 1985).

Whether or not the numbers on a decline in teacher quality and a decrease in teacher quantity support the conclusion that there is a crisis, many state and local educational agencies have been convinced that some new strategies for recruiting, preparing, and retooling the teaching profession are advisable. At least 18 states have passed provisions allowing the development of retraining programs and alternate routes to teacher certification (AACTE, June

1986). Programs are already in place. It is with this reality that this study begins.

Study Methods

The analyses and findings in this report are based on a literature review; printed descriptions of a sample of 20 alternative certification and retraining programs; and, for 10 of the programs, telephone interviews with program administrators, program participants and their supervisors, and traditionally prepared teachers who had contact with participants. A total of 76 unstructured interviews were completed. More detail on the methods is provided in Appendix A to the report.

Organization of the Report

The remainder of this report presents the information that emerged from print descriptions of alternative certification and retraining programs and the interviews conducted for the study. Chapter II broadly describes the 20 programs that constituted the original sample. Chapter III describes and analyzes the 10 programs examined in depth. Chapter IV examines program outcomes. The final chapter summarizes the study's findings and suggests some ways in which the experiences of alternative certification and retraining programs may be of use to local, state, and national policymakers.

Several appendices follow the report. Appendix A, as noted above, describes the methodology for the study. Appendix B describes 10 identified alternative certification and retraining programs in some detail. Appendix C supplies briefer overviews of 10 other programs. Appendix D is an annotated bibliography covering several areas of research literature related to the study's purposes.

II. OVERVIEW OF 20 ALTERNATIVE CERTIFICATION AND RETRAINING PROGRAMS

This chapter presents a descriptive overview of a pool of 20 alternative certification and retraining programs.

The overview compares and contrasts 20 programs on the following variables: program orientation and general outcomes, the number of participants, program maturity, organizational participation, and funding information. Budget information on the 10 programs studied in depth is also examined.

The following points about this sample are of particular interest:

- Of 12 alternative certification and 8 retraining programs, over half are specifically dedicated to the preparation of math and/or science teachers. Retraining programs are more heavily focused on these areas.
- Program enrollments vary greatly, ranging from 8 to 5,000 during the last school year.
- Major costs are instruction and stipends for participants and/or their supervisors.

Program Orientations

All 20 identified programs lead to teaching certification or recertification. Two programs also result in a Master of Education degree. A third offered the master's in the first cycle but will drop the degree program in 1986-87. Several programs offer courses that participants may apply toward a master's if they choose to continue their education.

Eleven of the 20 programs are focused strictly on preparation of math, science, and computer teachers. The other programs train teachers either for all subjects at the secondary level (one specifies math, science, and English) or for all levels and subjects. Table II-1 shows the programmatic orientations for the pool and for the 10 programs examined in depth.

Table II-1
Math/Science Orientation of 20 Alternative Certification and Retraining Programs

Program Orientation	Pool of 20	Sample of 10
Math, science, computers	11	5
Secondary subjects (including but not restricted to math and science)	3	2
All levels and subjects	6	3

Developers of the retraining programs were strongly influenced by the reported shortages of math and science teachers. As Table II-2 shows, the alternative certification programs are fairly evenly distributed across the three program orientations, while retraining programs are heavily focused on math and science.

Table II-2
Difference in Program Orientation Between Alternative Certification and Retraining Programs

Program Orientation	Alternative Certification (N=12)	Retraining (N=8)
Math, science, computers	4	7
Secondary subjects (including but not restricted to math and science)	3	--
All levels and subjects	5	1
Total	12	8

Number of Participants

Enrollment sizes vary widely among the identified programs. The range for eighteen programs during 1985-86 was from 8 participants to 5,000. (Information was unavailable for two programs.) The program serving the largest number is a state-wide retraining effort targeted at staff teaching out-of-field in math and science. Although participants in this program can theoretically accumulate enough credits through the workshops offered to

obtain recertification, most use the program for in-service training. The smallest program is one of three retraining programs sponsored by the state of Delaware.

About half of the programs are small, admitting fewer than 30 participants to each cycle. Another four fall in a middle range of approximately 35-60 participants per year. Five are large programs, working with 90 or more potential teachers or retrainees annually. Two of the large programs are associated with major city school systems and three are state-wide programs with multiple sites.

Table II-3 presents summary information on enrollment and other descriptive features of the 20 programs. Significant second year drops in enrollment in the Arizona Partners Project, the Houston Alternative Certification Program, and the Los Angeles Unified School District Teacher Trainee Program are not related to the within-year attrition rates reported in the next column. Arizona admitted fewer participants for the coming year because of funding difficulties. Houston and Los Angeles apparently admitted large groups in the first year to alleviate some very critical shortages and are now proceeding at a more moderate recruitment pace.

Program Maturity

All but two of the 20 identified programs began operations in the 1980s. Nine were established in 1985 or 1986. Pennsylvania began its Teacher Intern Program in 1972; the Long Island University math retraining program has been in existence since 1977.

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Table II-3

Descriptive Characteristics of 20 Alternative Certification and Retraining Programs

Program	Start Date	Subject Areas	Organizational Participants	Enrollment	Attrition Rate	Outcome
ALTERNATIVE CERTIFICATION						
Arizona Partners Project	Summer 1985	Math, Science	LEAs, IHE State gov't Business/industry	1985: 22 1986: 6	18%	1st cycle: Master's Certification
Univ. of Massachusetts Math/English/Science/ Technology Project	1983	Math, Science English	IHE, LEAs Business/industry	20/year	--	Master's degree Certification
George Mason University Career Switcher Program	1986	Science	IHE	12	--	Certification
Harvard Midcareer Math and Science Program	1983	Math, Science	IHE, LEAs	1983-84: 6 1984-85: 18 1985-86: 20	5%	Certification
Houston Alternative Certification Program	Summer 1985	Secondary English, Math, Science; Bilingual/ ESL, preK-5th	LEA, IHE	1985-86: 330 1986-87: 100	39%	Certification
Los Angeles Unified School District Teacher Trainee Program	1984	Math, Science, English, Social Studies (Secondary)	LEA	1984-85: 160 1985-86: 90	13%	Certification
University of Maryland Alternative Certification Program	1985	All subjects and levels	IHE, SEA	1985-86: 8 1986-87: 26	--	Master's degree Certification
Memphis State University Lyndhurst Program	1985	Secondary level shortage areas	IHE, LEAs	1985-86: 12 1986-87: 23	--	Certification
New Jersey Provisional Teacher Program	Summer 1985	All subjects and levels	SEA, LEAs, IHEs	1985-86: 186	9%	Certification
Univ. of New Mexico/ Santa Fe Public Schools Intern Program	Summer 1985	All subjects and levels	LEA, IHE	1985-86: 16	6%	Certification
Pennsylvania Teacher Intern Program	1972	All subjects and levels	SEA, IHEs	Not available	--	Certification
University of Southern Maine Teachers for Secondary Schools Program	1983-84	All subjects (secondary)	IHE, LEAs	15-16 per year (3 cycles)	0%	Certification (automatic on program completion)

Table II-3 (continued)

Descriptive Characteristics of 20 Alternative Certification and Retraining Programs

Program	Start Date	Subject Areas	Organizational Participants	Enrollment	Attrition Rate	Outcome
RETRAINING						
Anne Arundel County, MD Science Retraining Program	1984	Science	LEA, IHE	50 (approx.)	--	Recertification or upgrading
State of Delaware (3 programs)	Summer 1985	Math, Science, Computers	SEA, IHEs, LEAs	Summer Institute: 1985-86: 100 Academic Year Institute: 1985-86: 68 Scholarship Loan Program: 1985-86: 8 1986-87: 6	Summer Institute: 60% Academic Year Institute: -- Scholarship Loan Program: --	Recertification
Forsyth County, NC Consortium for Personnel Development	1981	All subjects and levels	LEA, IHEs	1982-85: 46	22%	Recertification
New York City Math/Science Relicensing Program	1982	Math, Science,	LEA, IHEs	Not available	--	Recertification
Long Island University Mathematics Retraining Program	1977	Math	IHE	1984-85: 28 (previous years approx. 50)	18%	Recertification (LEA test required)
Los Angeles County Teacher Retraining Program	1982-83	Math, Science	SEA, County, IHEs, LEAs	Site 1: 1984-85: 60 1985-86: 21 Site 2: 1985-86: 35 1986-87: 40	33% (approx.)	Recertification (Supplementary Authorization)
North Carolina Math and Science Education Network	1983	Math, Science	IHEs Business/Industry	3rd cycle: 5,000 at 8 centers	--	Recertification possible
Virginia Commonwealth Univ. Capitol Region Earth Science Institute	1985	Science	SEA, IHE	60	--	Recertification

Organizational Participants

Programs vary widely in the complexity of their organizational arrangements, but most involve more than one entity. Typical participants are the SEA, one or more LEAs, and one or more IHEs; business and industry occasionally participate.

Although multiple organizations may participate in a program when it becomes operational, a single sector usually provides the original impetus and takes the lead in designing the program. In nine of the 20 programs, the instrumental body was at the state level--either an enabling statute by the state legislature or an initiative of the SEA. Institutions of higher education initiated eight programs; three programs originated with an LEA.

Funding Information

Table II-4 presents the sources of funding and the types of financial support available to participants for the 20 alternative certification and retraining programs.

Funding sources for these programs vary considerably. In three cases where the state has been the initiator of a program, a major proportion of the program's financial support is included in the SEA's annual budget. The New Jersey program, which is almost entirely tuition-funded, is an exception to this rule. The Los Angeles and Houston LEAs fund their own alternative certification programs.

Three programs (University of New Mexico/Santa Fe, Long Island University, and the North Carolina Mathematics Science Education Network) received partial funding from the Education for Economic Security Act's Title

Table II-4
Sources of Funding and Types of Participant Financial Support
for 20 Alternative Certification and Retraining Programs

Program Name	Funding Sources	Financial Support of Participants
ALTERNATIVE CERTIFICATION		
Arizona Partners Project	SEA, LEAs	Forgiveable loan; salary
George Mason University Career Switcher Program	Federally funded	Standard student financial aid; some scholarships
Harvard University Math and Science Program	Not available	Standard student financial aid; some scholarships
Houston Alternative Certification Program	LEA	Salary; tuition waiver
Los Angeles Unified School District Teacher Trainee Program	LEA	Salary; tuition waiver
University of Maryland Alternative Certification Program	IHE, small state grant	Standard student financial aid; salary
University of Massachusetts Math/English/Science Technology Project	IHE, FIPSE, business/ industry	Standard student financial aid; salary
Memphis State University Lyndhurst Program	Foundation, LEAs	Stipend; salary
New Jersey Provisional Teacher Program	Tuition, LEAs, foundation	Salary; 15 grants/year
University of New Mexico/ Santa Fe Public Schools Intern Program	SEA (Title II), LEA	Stipends; tuition waiver
Pennsylvania Teacher Intern Program	Individual participant	Salary; standard student financial aid
University of Southern Maine Teachers for Secondary Schools Program	Tuition	Standard student financial aid

Table II-4 (continued)
Sources of Funding and Types of Participant Financial Support
for 20 Alternative Certification and Retraining Programs

Program Name	Funding Sources	Financial Support of Participants
RETRAINING		
Anne Arundel County (MD) Science Retraining Program	LEA	Tuition waiver
Delaware (3 programs)	SEA	Varies by program: tuition waiver for all; Stipends for 2 of the 3 programs
Forsyth County (NC) Consortium for Personnel Development	Tuition	None
Long Island University Mathematics Retraining	SEA (Title II), FIPSE	Stipend (Title II money)
Los Angeles County Teacher Retraining Program	SEA	Tuition waiver
New York City Math/Science Retraining Program	LEA	Tuition waiver
North Carolina Math and Science Education Network	SEA (Title II), foundations, business/industry	Not available
Virginia Commonwealth Univ. Capital Region Earth Science Institute	SEA	Tuition waiver

II in 1985-86. Other federal sources of funding include the Fund for the Improvement of Postsecondary Education (University of Massachusetts and Long Island University) and the Office of Educational Research and Improvement (George Mason University).

Three programs (Arizona, University of Massachusetts, and the North Carolina Network) have enlisted the support of business and industry. Memphis State, the North Carolina Network, and New Jersey have received financial backing from nonprofit foundations. Programs at the University of Southern

Maine and in Forsyth County, North Carolina are almost entirely tuition funded.

Among the 20 programs, there are five basic models for the financial support of program participants:

(1) standard student financial aid packages

(2) forgiveable loans

(3) tuition waivers

(4) salaries, where internships involve full responsibility in a classroomm

(5) stipends, in lieu of or in addition to salary

The most common type of support is the tuition waiver. Some programs combine two or more types of support. For example, participants in Delaware's Teacher Scholarship Loan Program receive stipends equivalent to their salaries for the year they are on sabbatical for retraining. In addition, they are eligible for tuition and fee loans of up to $5,000 that are 100 percent forgiveable after three years of teaching math or science in Delaware public schools.

Table II-5 includes specific budget information on the 10 programs studied in depth. Principal program costs are instruction and supervision and student support. Other costs range from administration to printing to social events.

The mean total annual budget is $224,208. This figure is actually based on 11 separate programs. Costs are not available for Harvard's program; however, the total cost for Delaware includes three programs with separate total annual budgets. The median for these 11 programs is $199,000. The range is from $49,400 to $552,365.

Because the programs vary widely in the total number of participants they enroll, per participant costs are a more meaningful statistic for comparison. The mean per participant cost is $5,040. The median is $2,693 and the range

Table II-5
Budget Information on 10 Alternative Certification and Retraining Programs

Program	Number of Participants	Total Annual Budget	Instruction/ Supervision	Student Financial Support	Other	Cost Per Participant
ALTERNATIVE CERTIFICATION						
Arizona Partners Project	22	$178,000 (estimated)	$48,000	$91,000	$22,000	$8,091
Harvard Midcareer Math and Science Program	18	Not available	--	--	--	--
Houston Alternative Certification Program	330	$552,365	Budget breakdown not available			$1,674
Los Angeles Unified School District Teacher Trainee Program	90	$146,720 (estimated)	Budget breakdown not available			$1,630
New Jersey Provisional Teacher Program	184	$311,600 (estimated)	$211,600	$75,000 (15 fellowships)	$25,000	$1,286
University of New Mexico/ Santa Fe Public Schools Intern Program	16	$208,000	$86,000	$112,000	$10,000	$13,000
University of Southern Maine Teachers for Secondary Schools Program	16	$49,400	$46,800	--	$2,600	$3,088
RETRAINING						
Delaware	176 (3 programs)	$397,500 (3 programs)	Budget breakdown not available			3 programs: $1,990 $1,449 $12,500
Long Island University Mathematics Retraining Program	28	$220,400	$50,400	$25,000	$145,000 (Dissemination/ Administration)	$2,693 (estimated)
Los Angeles County Teacher Retraining Program	111 (3 sites)	$500,000	$300,000	Unavailable	Unavailable	$4,505

is from $1,284 to $16,533. These figures do not include LEA salaries paid to alternative certification program participants who are fully responsible for classrooms. They do include monies disbursed as stipends, whether for tuition or for living expenses. Although programs serving small numbers of participants are considerably more expensive to run, there are other characteristics associated with smallness that are valued by administrators and participants, such as closer supervision of field experiences and strong interpersonal support systems. None of the small programs in the sample plans any significant increase in enrollment in the foreseeable future.

III. DESCRIPTION AND ANALYSIS OF TEN ALTERNATIVE CERTIFICATION AND RETRAINING PROGRAMS

To obtain a more in-depth view of teacher alternative certification and retraining programs, we selected 10 of the 20 identified programs described in Chapter II for closer study through telephone interviews. Seven of the programs chosen are alternative certification programs and three focus on retraining. Selection criteria included program maturity, locus of administrative control, and the uniqueness of the model. Neither the study team nor, we suspect, anyone else can describe the modal alternative certification or retraining program at this time. We found many similarities among programs as well as significant differences. Full descriptions of the 10 programs are found in Appendix B to the report.

In the telephone interviews, we sought to identify who was being attracted to alternative certification and retraining programs, to make preliminary assessments of the training effectiveness of the programs from several points of view, and to estimate the impact of the programs on school-based personnel. The results of the interviews suggest the following major points:

- Alternative certification programs are attracting and preparing high caliber, subject matter proficient teachers from a variety of labor market pools.
- Retraining programs are heavily focused on preparing teachers for recertification in math or science and appear to attract teachers seeking a new challenge or teachers who feel their jobs are insecure.

Participant Characteristics

Age and Educational Background

Interviews were conducted with 24 program participants: 16 in alternative certification programs and 8 in retraining programs. Table III-1 presents the age categories, undergraduate majors, and advanced degree status of the sample.

Table III-1
Age and Educational Background of Program Participants

	Alternative Certification (N=16)	Retraining (N=8)
Age Ranges		
21-30	9	--
31-40	7	6
41-50	--	2
Undergraduate Major		
Sciences	4	1
English	3	--
Math/Computers	2	--
Psychology	2	--
Liberal Arts	2	1
Education	--	4
Modern Languages	1	1
Other	2	1
Advanced Degrees		
Master's	3	2
Ph.D.	2	--

Alternative certification candidates in the sample tend to be younger than participants in retraining programs. The principal reason for this is that four programs--Arizona, Los Angeles Unified School District, New Jersey, and the University of New Mexico--specifically recruit recent graduates of institutions of higher education. (The Arizona, Los Angeles, and New Jersey programs are not limited to recent graduates; however, recruitment and placement efforts focus on this group.) Harvard and the University of Maine, on

the other hand, target mid-career and career re-entry candidates, who tend to be over 30. Houston is interested in attracting homemakers and retired military personnel as well as mid-career people; the program is making special efforts to recruit Hispanics. Differences in specific groups targeted by the programs seem to be largely due to program developers' knowledge of and perceptions about the potential availability of particular groups in the local labor market.

By their very nature, retraining programs are designed for experienced teachers. Six of the eight retrainees in the sample are in their thirties. The range of years in teaching for these teachers is from eight to 15 years; the mean is 12 years. While no definitive conclusions can be drawn based on a sample of eight, interviews with program administrators and participants in the retraining programs indicated that boredom with one's original teaching field and the need to find new personal goals in a profession that currently offers little opportunity for advancement tend to occur when teachers are in their thirties and have been teaching for 10 to 15 years.

The undergraduate majors of program participants in both alternative certification and retraining programs were varied. The seven science or math majors represented in the sample were all involved in programs specifically focused on preparing science and math teachers. Six of the seven participated in alternative certification programs. Other majors among the alternative certification candidates included psychology, business, communications, modern languages, and liberal arts.

Of the eight retraining candidates, four were undergraduate education majors: two in physical education, one in special education, and one in elementary education. Other majors included Spanish literature, earth science, liberal arts, and home economics.

Five alternative certification program participants held advanced degrees. Two have Ph.D.s in the sciences. Masters' degrees represented were in counseling, biology, and, surprisingly, education. The particular individual with an M.Ed. has been working in museum education; the content of her degree program did not meet state requirements for secondary school teaching. Two retrainees held masters' degrees--one in education and the other in Spanish literature.

In general, the alternative certification program participants whom we interviewed had very strong undergraduate backgrounds. Several had attended Ivy League institutions or very selective small liberal arts colleges. Some had graduated with honors. Participants in the large city programs are somewhat more likely to be graduates of public universities.

Several of the alternative certification programs are specifically and apparently successfully recruiting top students from prestigious schools. In fact, it seemed to us that one university-based program is applying considerably more stringent selection criteria to applicants for its alternative certification program than it is for its traditional undergraduate and graduate education programs. At least for the present, while the idea of alternative certification is new, the programs have the luxury of high applicant-to-participant ratios, allowing them to choose the strongest candidates. This is particularly true for the smaller programs.

The academic profile of retraining program participants is less clearcut. While the programs do have selection criteria, they are by definition recruiting from the pool of existing teachers--a group that according to national statistics, is less talented academically than many other college graduates. On the other hand, there are teachers with very strong educational backgrounds and it appears that retraining programs can and do attract some very capable individuals who want the challenge of mastering a new field.

Previous Experience

The 16 participants in alternative certification programs came from a wide range of occupational backgrounds. One had been a missionary. Another was an air force officer. Three had worked at professional levels in business and industry. Four were in wholesale or retail sales. Six participants in the sample had been recruited to alternative certification programs directly out of college. In one way or another, more than half of the 16 had some type of instructional experience: tutoring, emergency or substitute teaching, college level teaching, Peace Corps, or museum education.

The retrainees, all of whom are now or are preparing to be math and science teachers, were originally certified in the following areas: elementary education (2); special education (2); physical education/health science (1); earth and space science (1); social science (1); and Spanish (1). Four of these eight people were already teaching in shortage areas (special education, earth science, and foreign language) prior to their recertification.

Motivation for Entering Program

The program participants interviewed were asked why they had decided to enter teaching or retrain for another field. Table III-2 shows the most common responses. Many participants cited more than one reason.

The fact that seven alternative certification candidates stated that they had always planned to teach at some point in their careers indicates that these programs are timely and are tapping a significant pool of individuals with the desire to teach. Some participants told us that without an alternate route to certification they would have been unlikely to pursue their interest in teaching. One participant described her frustration in attempting to obtain certification on her own. She would have been required to enroll in undergraduate methods courses for at least four semesters at an institution a

Table III-2
Reasons Cited for Entering Alternative Certification
or Retraining Programs

Reason	No. of Respondents
Alternative Certification Programs:	
Always planned to teach sometime	7
To avoid education courses	4
On-the-job training with pay	4
Came from a family of teachers	3
Retraining Programs:	
Always wanted to teach math	3
Looking for a change	3
Job mobility	3
Always wanted to teach high school	2

considerable distance from her home. Another participant in a different state had been substitute teaching but was discouraged by the cost of the two years of teacher training required for a standard credential.

Many alternative certification program participants cited the short time frame, the limited amount of "Mickey Mouse" coursework, and/or the attractiveness of on-the-job training (often for pay) as major enrollment motivators. Most also had other, more personal reasons for signing on. Several of the recent college graduates seemed to have emerged from their undergraduate programs with ill-defined career goals. One told us, "I needed a job and didn't really want to commit to a career in industry yet." Another said, "My original plan was to get some other experiences first and then teach, but then this program came along."

Mid-career people tended to have more thoughtful or deliberate reasons for entering the alternative certification programs. One experienced biology professor wanted to relocate to a particular geographic area but was unable to find a college teaching job (for which he would have needed no teaching credential!). The program he entered allowed him to teach high school biology

while completing certification requirements. A chemical engineer spoke of the need to do "something more meaningful;" a middle management executive only half-jokingly referred to a mid-life crisis.

The retrainees, for the most part, were motivated by either static or unstable professional lives. A health science teacher wanted more in-state job mobility that he felt a math credential would bring. An eight year veteran had been functioning as a "permanent substitute" in his large district for several years. This meant a new assignment each year, no continuity, and a considerable amount of job anxiety. He felt that certification in mathematics would stabilize his teaching existence. A Chapter 1 teacher worried about the stability of federal funding levels for her program. Two other teachers used the terms "burning out" and "stagnating" in describing their reasons for seeking retraining.

Program Components

Alternative Certification Programs

Among the sample of programs examined in this study, the typical alternative certification program includes a formal instructional component, some type of intensive field experience, and close supervision. In the more traditionally structured programs, participants are full-time students at a college or university for the first semester and combine student teaching and academic coursework during the second semester. Programs which depart from this pattern feature full or part-time classroom teaching responsibility for a school year. In these programs, formal instruction in educational methods, educational foundations, and child psychology occurs during afterschool hours and sometimes on Saturdays. Many of the programs require some coursework

and/or classroom observation during the summer as well. Table III-3 outlines components of the seven programs examined in depth; more detail appears in Appendix B.

Formal instruction. Much of the formal instruction presented to participants in alternative certification programs resembles the content of traditional undergraduate teacher education. Although it would be difficult to characterize the "typical" undergraduate teacher education program, given the diverse ways in which American colleges and universities count credit hours and the fact that each state sets its own certification standards, the American Association of Colleges for Teacher Education estimates that about 40 percent of an elementary and 30 percent of a secondary teacher's college program is composed of the professional studies leading to certification (AACTE, 1981). This translates to about 16 courses over eight semesters for elementary education majors and 12 for secondary teachers, including what is usually a double credit for student teaching in the senior year. The traditional teacher education curriculum includes the philosophical, historical, and sociological foundations of American education and what are usually referred to as "methods" courses--a rubric that covers instructional strategies, classroom organization and management skills, diagnostic and evaluation techniques, and topics specific to the level or subject to be taught.

Alternative certification program participants receive instruction in these same areas. Unfortunately, we found it impossible to accurately reduce the hours, credits, and modules associated with each individual alternative certification program to a common denominator. Designers of programs have employed different strategies to create a curriculum that (1) meets state requirements for certification, (2) takes into account the post-graduate status and maturity of the populations being recruited, and (3) in most cases

Table III-3
Components of Seven Alternative Certification Programs

Program	Duration	Formal Instruction	Field Experience	Supervision
1. Arizona Partners Project	14 months	24 credits for certification	2 paid internships: school and industry	IHE, retired businessmen
2. Harvard Midcareer Math and Science Program	9 months	18 credits	60 hrs. observation 12 weeks student teaching	IHE, mentor teacher
3. Houston Alternative Certification Program	12 months	40 hrs. preassignment training 15-20 instructional modules	25 hrs. observation Paid full time teaching	Mentor teacher, principal, program administrators
4. Los Angeles Unified School District Teacher Trainee Program	24 months	19 units 32 units Masters	Paid full time teaching	Mentor teacher, principal
5. New Jersey Provisional Teacher Program	12 months	200 hours	Paid full time teaching	Support team (4 persons), mentor teacher
6. University of New Mexico/Santa Fe Public Schools Intern Program	14 months	32 hours	Summer school, 1 year internship with stipend	IHE, 2 full time clinical support supervisors
7. University of Southern Maine Teachers for Secondary Schools Program	9 months	15 credits	1 semester internship	IHE, mentor teacher

synthesizes and compresses the material to be covered into a shorter time frame. It is our best estimate that the essential content of traditional teacher education is being adequately covered.

Before establishing its program, New Jersey convened a special commission to determine the basic elements of a teacher training curriculum. The areas identified by the commission--student learning and development, curriculum and evaluation, and classroom and school--became the backbone of the program's 200 hour instructional component. These broad areas are typical descriptors of the content for other programs as well. Houston has developed "modules" that each participant must complete at a certain competency level. Both Houston and Los Angeles include special training in school district policies, multicultural education, and parental involvement. The University of Southern Maine has an interdisciplinary approach that focuses on schools and classrooms as social systems.

Several of the programs offer courses that carry graduate credit and may be applied toward a master's degree. In most cases, classes are scheduled like graduate level courses for people who work full-time--two or three hour blocks in the late afternoon and early evening. More detail on the content of formal instruction for each program can be found in Appendix B.

Field experience. In five of the programs (Arizona, Houston, Los Angeles, New Jersey, and the University of New Mexico), participants assume full responsibility for a classroom either on the first day of school or within a month of that time. Based on the interviews, the success of this approach appears to depend very much on the effectiveness of the supervision provided to the novice teacher. Nearly all the candidates interviewed for the study had positive experiences in this regard. It was common, however, for them to comment that they had been fortunate and to follow with stories of

others who had been in impossible situations, either inadequately supervised (see the Supervision section below), given the worst classes, or subjected to unfair comparisons with better prepared beginning teachers. For our specific sample, the internship or student teaching experience was the highlight of their training.

In all the alternative certification programs, some formal instruction continues throughout the total 12 to 15 month period. For participants in the programs where full time teaching is required, the simultaneous pressure of day-to-day planning to teach and attending late afternoon or evening classes is arduous. This is particularly true at the beginning of the school year. Participants and their supervisors mentioned the deleterious effects of that amount of stress on physical and psychological health. New Jersey is modifying the pace of its initial instructional component in response to feedback of this type. We speculate that other programs may also find it necessary to reconsider the overall time frame as they mature.

Harvard and the University of Southern Maine defer classroom placement until the second semester. Participants thus have a semester of education-related coursework as background before encountering a group of students. The formal coursework they take during the field experience is also limited to a one night per week seminar designed to allow the sharing and mutual solution of problems encountered in the classroom. Interviewees from these two programs mentioned the stressfulness of their experience with less frequency.

Supervision. The quality of supervision that interns received strongly colored their overall perceptions of a program. As in traditional student teaching, a mentor teacher is usually assigned to each participant. Unlike the traditional route, many of the alternative certification programs provide stipends to classroom level supervisors. Recognizing the importance of mentor

teachers in this way may result in more dedicated supervision, although that relationship is not clearcut from this sample.

In general, participants in the alternative certification programs receive more supervision than the average student or first year teacher. Typical supervision of student and beginning teachers is often a matter of a few widely separated observations and an evaluation checklist, principally because of the number of individuals to be supervised, constraints such as time and multiple responsibilities, and/or inadequate training of supervisors. The supervisory model used by all the alternative certification programs is generally referred to as "clinical supervision." In its purest form, clinical supervision requires the investment of a great deal of supervisory time. Through regular discussions, the new teacher is encouraged to analyze his or her own work as a way of defining teaching strengths and identifying weaknesses. Most teacher educators, administrators, and teachers agree that this type of constructive criticism and analysis is the best type of supervision.

According to their descriptions of the supervision they received, all the alternative certification program participants in our sample benefited from better oversight of their initial teaching experience than is the norm. The smaller programs were particularly effective in this regard, giving considerable care to the choice of mentor or cooperating teachers who were willing to invest much time in the supervisory process. With more placements to make, the larger programs could not be as selective or give as much attention to finding an optimum match between mentor teacher and program participant. Nevertheless, the amount and quality of supervision was rated more than adequate by a large majority of program participants interviewed.

Supervision in alternative certification programs may be school-based or may involve both school and university personnel. Building principals play

some supervisory role in nearly all the programs. In New Jersey, interns have an experienced teacher or an administrator in the classroom at all times during the first month; supervision then tapers off to once a week for 10 weeks and once a month for the remainder of the school year. Theoretically, each candidate in this program is assigned a four person support team, including a mentor teacher, the school principal, and two other educators. For the participants interviewed, active supervision came from the mentor teacher and principal. (Principals must prepare formative and summative evaluations for submission to the SEA.) When one woman's mentor teacher abrogated responsibility, she turned to other teachers in her department, who willingly filled the gap.

Houston's model of supervision is similar to New Jersey's. The mentor teacher and principal have primary responsibility for day-to-day support. In addition, the district's Employee Development Department and staff of the Alternative Certification Program monitor progress and serve as resource persons to program participants.

The Santa Fe school district released one elementary and one secondary teacher from teaching responsibilities and assigned them as full time clinical support supervisors for the 15 program participants. Since interns in this program are placed in pairs, each supervisor covered four classrooms; on average, a supervisor was present in the interns' classrooms the equivalent of one full day per week.

In the four programs where an institution of higher education is one of the principal organizational components, an IHE supervisor visits the interns on a regular basis. Traditionally, colleges and universities supervise their student teachers in the field. It is also traditional for regular faculty members to consider supervision of student teachers an unwelcome burden and,

whenever possible, to assign this work to adjunct or lower rank faculty. The qualitative difference in the four alternative certification programs based in institutions of higher education is the full or nearly full time assignment of a committed faculty person to field supervision of interns. Both the Arizona and University of Southern Maine programs experienced some difficulties with supervision until this type of arrangement was worked out.

Retraining Programs

Retraining programs typically have only an instructional component. The amount of coursework that participants must take depends on state or local requirements for certification in particular fields and on the amount of previous coursework for which individuals receive credit. Standards are the same as those applied to undergraduate education majors.

Delaware defines specific 45 credit programs for certification in chemistry and physics (see Appendix B); 30 unspecified credits are required for math certification. Participants in the Long Island University retraining program take 15 to 18 math credits, depending on whether or not they enroll for an initial refresher course. The Los Angeles County program sets an 18 credit minimum, as required by the SEA, but many participants take refresher and computer courses as well.

The courses that retrainees take may be (1) versions of undergraduate math and science courses specifically adapted for adult learners, (2) regularly scheduled university courses, or (3) special sections of regularly scheduled university courses. The third strategy was most common in our sample. Keeping the retrainees together in a self-contained group has the advantage of encouraging formation of peer support groups and facilitates the scheduling of tutorials and review sessions.

Program Strengths: Participant Points of View

Alternative Certification Programs

Despite structural differences among the programs, several common themes arose when participants talked about a program's strengths. Table III-4 presents the most frequently cited positive features of alternative certification programs, based on data from 16 respondents who often cited more than one feature.

Table III-4
Participant Opinions on Strengths of Alternative Certification Programs

Program Feature	Number of Positive Responses
On-the-job training	8
Instructional content	6
Peer support systems	6
Selectiveness of the program	5
Supervision	5

On-the-job training. As noted earlier, on-the-job training--frequently at a full beginning teacher's salary--is a major motivating factor in attracting applicants to alternative certification programs. As difficult as the internship year may be, early and full exposure to classroom teaching remains a strong recommendation for alternate routes in the minds of many program completers. "Learning to teach through direct experience is the best thing about this program," one participant from Los Angeles said. A participant in economically depressed Houston noted that without the paid internship associated with his program, he would be unable to participate. In essence, participants confirmed their belief in the age old adage that "You learn to teach by teaching."

Instruction. Despite several general criticisms of the formal instructional component of some programs, six participants cited either their overall instruction or specific segments of it as being especially helpful. One currently popular approach to teaching strategies--Madeline Hunter's essentials of instruction--received particular acclaim. Hunter suggests a step-by-step planning process to help teachers prepare for each day's instruction. The approach is considered useful for both beginning and experienced teachers and has been adopted by many school districts.

Peer support. Participants consider peer support systems critical to successful completion of alternative certification programs. Six participants referred to this feature when asked about program strengths, but many others spoke of its importance during other parts of the interview as well. In some cases, peer support is deliberately built into a program. The University of Southern Maine begins each cycle with a four day Outward Bound type of experience designed to bond the new group of participants together. This strategy (or the university's commitment to the aim of peer support) has worked extraordinarily well: in three cycles, the program has had no dropouts.

New Mexico's practice of placing students in classrooms in pairs creates a peer support system that operates on a daily basis. The two interns plan together, share the teaching load, and observe and comment on each other's performance. One participant in the program commented about his partner, "We spent more time together than if we were married."

Even where peer support is an ad hoc program feature, participants found the opportunity to compare notes, complain, and counsel each other invaluable. In New Jersey, all three participants interviewed noted that the coffee breaks during their formal instruction were more helpful than the planned curriculum.

Information from this sample suggests that peer support systems are most viable when two or more interns are placed in the same school.

Selectiveness. Selectiveness of the program was cited as a strength by five alternative certification candidates. In fact, all seven programs in the sample are selective to the degree that all have more applicants than they can accommodate. Some are more selective than others. Particularly in the smaller programs such as Harvard, New Mexico, and the University of Southern Maine, participants saw themselves as unique types of individuals with something extra to offer as teachers. In part, this sense of uniqueness sustained them throughout the program.

Supervision. Five participants mentioned the quality of the supervision they received as a program strength. However, many more described the development of nurturing relationships with mentor teachers, administrators, or other faculty in other parts of the interview. One young woman was especially effusive about the comfortable relationship that developed with her mentor teacher. For her, the most important aspect of the clinical supervision provided was the encouragement and latitude to develop her own teaching style. This is indeed a different approach than traditional student teaching where by default, if not by design, most prospective teachers tend to imitate their cooperating teachers. Other interviewees cited the accessibility of the mentor teacher, principals, and even superintendents as critical to the success of the training experience. In the few cases where the formally assigned supervision was inadequate, the interns were able to find a supplement or a surrogate.

Retraining Programs

With fewer program features to react to, the eight retrainees focused their comments about program strengths on the quality of their instruction. In general, these participants viewed instruction by a combination of college faculty and secondary level master teachers as an optimum blend of the theoretical and the practical. Provision of tutoring or extra class sessions was essential to some and burdensome to others.

One math retrainee praised the high school master teachers who "taught you the 'language of math' and how to manipulate equations. This is the important thing for teaching the subject, not getting the right answer every time." Another, in a different program reiterated this theme, expressing appreciation that the program had located instructors "who could demonstrate how to present materials in an interesting way, not merely deliver the subject matter."

Program Weaknesses: Participant Points of View

Alternative Certification Programs

Table III-5 presents four areas in which the 16 alternative certification candidates found program weaknesses. Other participants cited two of these areas as program strengths--instructional content and lack of preparation before entering the classroom (as the obverse of on-the-job training in Table III-4). This bimodal pattern is not surprising. The programs are serving individuals with different backgrounds, different levels of confidence or apprehension about teaching, and different training needs. Most of the programs are also relatively new and therefore still in the process of adjusting

Table III-5
Participant Opinions on Weaknesses of Alternative Certification Programs

Program Feature	Number of Negative Responses
Scheduling problems	7
Instructional content	5
Lack of preparation before entering classroom	5
Placements	3

program components to fit the candidates whom they are recruiting. No participants expressed praises or criticisms of their programs in the interviews that had not already reached the ears of program administrators.

Scheduling. Scheduling problems were program specific. Participants in more than one program mentioned the burden of late afternoon or evening classes after a full day of teaching. One participant in the Arizona Partners Program had reservations about the advisability of splitting fieldwork between teaching and industry, even though that feature had originally attracted him. In practice, students saw the person who taught during the first semester as the teacher of record and the second semester teacher as a substitute. Furthermore, he felt, just as one began to get things under control, either it was time to move on to the other internship or the year was over.

Houston's combination of nine month and year round schools also caused some scheduling difficulties. Participants placed in year round buildings had to negotiate release time to complete the instructional component of the program during the second summer.

Instructional content. Five participants--each from a different program--found the instructional component of little overall value or relevance. The fact that no two participants in any program expressed this critique indicates that reactions to courses in teaching theory and methodology are

idiosyncratic. Some negative responses may be conditioned by the widely held belief that the only way to learn to teach is by doing it. One woman said, "The only thing I remember is Bloom's taxonomy." A recent college graduate felt that much of the formal instruction duplicated psychology and sociology courses that she had taken as part of the general education requirements at her liberal arts college. The need for more "how to" course content was mentioned frequently--how to write a lesson plan, how to set up a gradebook, how to handle a discipline problem, how to construct a test. One participant did admit that although he thought the coursework was mostly a waste of time, some if it became relevant as the year progressed.

Lack of preparation. All five individuals who felt unprepared for the responsibility of taking over a classroom were in programs where trainees are hired as the teacher of record at the beginning of the school year. Supervisors described only one of the five as truly struggling. Another was cited as "the most improved" intern in his group at the end of the cycle. The other three had had at least average success in the program. Some participants made suggestions: let interns begin as aides; provide some initial coursework, observation, or student teaching in the summer preceding the placement (already a feature of some programs); work on a better model of supervision.

Placement. Three interns stated that classroom placements of alternate routers had not been uniformly successful. Two had no personal problems in this regard but were aware that peers had bad experiences. The other reported never really seeing her supervising teacher after the first month. He would occasionally appear during an advanced computer class that she taught to give the students some work that he wanted done. The intern resented this abrogation of responsibility on two counts. First, because there were other interns in the school who were experiencing strong and positive supervision, she was

able to see how the relationship should work. Second, part of her tuition money went directly to a stipend for the cooperating teacher, who in her opinion had not earned it.

Retraining Programs

As with program strengths, retrainees' perceptions of program weaknesses focused on the instruction they had received. Participants in one program in particular had encountered an old problem: the belief on the part of college faculty that teachers are not very bright. The attrition rate in this program is extremely high, a fact that program administrators attribute to this attitude problem. Program administrators are aware of the situation and are working to alleviate it.

IV. PROGRAM RESULTS

The study we undertook cannot be called an evaluation of alternative certification and retraining programs. For one thing, many of these programs are very new. An evaluation of their impact would be premature in many cases. There is also the question of appropriate evaluation criteria. Should these programs be judged by their success in recruitment? By their retention or completion rates? By the number of program completers who go on to find and keep teaching positions? Or, should success be measured by how well alternatively certified or retrained teachers perform on the job--over time--in comparison with their traditionally prepared counterparts? If the last option is chosen, what should be the basis for comparison? Student achievement? Administrators' evaluations? The states, local school districts, and institutions of higher education involved with the programs must confront these evaluation issues sooner or later.

Particularly for the alternative certification programs, an aggressive evaluation strategy might involve establishing direct collaboration with initiatives such as the Carnegie Forum's prototype work on national standards for the teaching profession and the Holmes group's plans for a new professional structure. The alternate route programs are in a unique position to serve as laboratories for these reform efforts. Evidence is needed about the effectiveness of selective recruitment, intensive post-baccalaureate instruction, and supported on-the-job training, all of which could be part of a new professional configuration. In fact, the alternative certification programs really have an obligation to share their experiences with each other, with policymakers, and with any ad hoc reform groups.

Without taking a definitive position on the best or most appropriate evaluation strategies for alternative certification and retraining programs, we nevertheless explored some of the variables that might be studied in future work. We have already described the types of individuals attracted to the programs and are impressed with the calibre of the people we interviewed. Furthermore, almost all of the programs studied, of either type, were carefully planned to include supervision and other types of support systems designed to help the participants succeed. This makes eminent sense and is apparently working well since attrition rates in most programs are quite low.

Within the structure of our own study design, the other kinds of program results that could be explored included (1) supervisors' assessments of participants' performances and (2) available information on post-program outcomes. Finally, we were interested in the degree to which regular teachers and school administrators were supportive of alternative certification and retraining. This chapter describes the information we obtained in these three areas.

Alternative Certification Programs

Supervisors' assessments. Supervisors of the 16 alternative certification candidates were asked to assess program participants on dimensions typically used to evaluate student or beginning teachers. These included: mastery of subject matter, knowledge of a variety of teaching strategies, competence in managing a classroom, organizational skills, appropriate expectations for students, and self-confidence in front of a class. Without exception, supervisors reported that the candidates had better than average or superior mastery of the subjects they were teaching. In two cases, supervisors noted that other teachers in a department had come to regard an intern as a subject matter resource.

In other competency areas, the pattern of interns' strengths and deficiencies in their initial teaching assignments parallels that of traditionally trained first year teachers. Table IV-1 summarizes the supervisors' assessments. For some interns, more than one supervisor was interviewed.

Table IV-1
Supervisors' Assessments of Areas Needing Improvement
for Participants in Seven Alternative Certification Programs
(N=16 participants)

Area Evaluated	No. of Participants Needing Improvement
Classroom management	13
Expectations for students	8
Planning for instruction	3
Self-confidence in front of a class	3
Strategies for teaching	2

The most striking thing about the supervisors' comments, taken as a whole, is the lack of criticism of the alternate route candidates. The referent group for most supervisors is traditionally prepared beginning teachers. Like most novices, alternative certification program participants are judged inexperienced in the area of classroom management, which is primarily interpreted to mean discipline and order. In other areas, however, the interviews with supervisors elicited few negative comments.

The area of holding appropriate expectations for students raises an interesting issue. Many participants in the alternate route programs studied are themselves high academic achievers. Supervisors of half the participants felt that these interns needed to adjust their expectations downward to fit the levels and classes they were teaching. On the other hand, a body of educational research suggests that students respond to high expectations with improved performance. One possible future area for research might well include comparison of student performance standards in classrooms of traditionally and nontraditionally trained teachers.

Supervisors' overall assessments of alternate route teacher candidates on a four point scale from superior to below average are presented below:

Superior:	7
Above average:	7
Average:	1
Below average:	1

The participants to whom the study team was referred for interviews are overwhelmingly considered superior or above average. A selection effect undoubtedly affected this sample. Nevertheless, based on some supervisors' generalizations about larger numbers of alternative certification program participants, the alternate routes appear to be preparing average or above average teachers for local school districts.

Post-program outcomes. Placement information on alternative certification program participants is incomplete. Many programs either have not systematically tracked their graduates or are so new that first cycle participants are now seeking positions as fully certified teachers for the 1986-87 school year.

The University of Southern Maine reported that all program completers (n=45) who wanted to teach were now placed. While there is no attrition rate of participants in this program, administrators described one program completer who took a position and was assigned five different preparations, no preparation period, and no support as a first year teacher. She quit in short order and has not returned to teaching. This is a single example, but it may reflect the experience of some proportion of the individuals trained through alternative certification programs. Traditionally prepared beginning teachers, of course, are just as likely to encounter this type of situation. The question for future research would be whether teachers prepared through

alternate routes are less, equally, or better equipped to deal with the stresses of their first unsupported teaching job than education majors.

Interns who successfully complete the Houston and Los Angeles programs are virtually assured of a regular classroom assignment because of those cities' severe teacher shortages. Arizona also guaranteed positions for participants. This is not true for completers of the other programs. Once certified the individual pursues a job on his or her own.

New Jersey recently determined that over 90 percent of its trainees who began the program last September completed and presumably qualified for certification. Information is not yet available on whether these new teachers sought and found permanent positions.

The University of New Mexico/Santa Fe program presents a curious dilemma. The first cycle of the program produced 15 certified teachers. Apparently the school district has no real shortage and, in order to leave openings for a new cycle of interns, was unable to hire the program completers. The most up-to-date information about completers of this program indicates that some have dispersed to other parts of the state or the country and some will teach in private schools (including a Bureau of Indian Affairs school) during 1986-87.

Participants in Harvard's Midcareer Math and Science Program apparently disperse throughout the nation. We interviewed individuals in Utah and Massachusetts and attempted to reach graduates in New Hampshire and New York City. In 1984-85, 15 of 21 program participants sought and found teaching positions.

Teaching fields of participants interviewed. The 16 alternative certification candidates interviewed interned in the following areas:

Science	5
Math/Computers	4

English	3
Elementary education	3
Foreign languages	1

Ten of 16 interviewees qualified to teach at the secondary level in science, math/computers, and foreign languages--widely cited as critical shortage fields. Four were in programs that prepare only math and science teachers. The fact that state and locally based alternative certification programs seem to focus on these areas indicates that shortage estimates may have some basis in reality. The issue may not be entirely one of quantity, however. If the alternatively certified teachers are superior instructors, as the evaluations of their supervisors seem to indicate, they may replace less effective teachers. Those teachers, in turn, may end up teaching out-of-field or in districts where quality factors in personnel are secondary to the need to fill classrooms.

Some local districts, particularly urban ones, also need more elementary teachers. Two of the elementary level interns interviewed teach in Houston; the third interned in Santa Fe. Two of the three candidates in English were participants in the University of Southern Maine's program. Both are currently employed as English teachers in the greater Portland (ME) area. The third English major interned in Los Angeles where shortages exist in virtually all areas.

Retraining Programs

All eight retrainees were preparing for recertification in math or science. Of the eight, half will be teaching in the area for which they retrained in 1986-87. One math retrainee failed to obtain a math credential because of a bureaucratic error of the type unique to large city school

systems and has gone on to earn a master's degree and a teaching position in computer programming. Another math retrainee has opted to teach in a new alternative program for 14 and 15 year old at-risk students; he will have a self-contained classroom and will be responsible for teaching all subject areas to his students. A third candidate, an earth science teacher, obtained recertification in chemistry and continues to await an appropriate placement in his local school district. One interviewee had not yet completed her retraining in math and will continue as a Chapter 1 teacher.

We found the fact that three out of eight retrainees were not teaching in their area of recertification curious. From the retrainees interviewed, we also gathered that others in their respective groups either did not look for or were unable to find math and science positions. These findings suggest that the states and institutions of higher education sponsoring these and similar programs may need to consider some strategies for strengthening the mutual commitments of local districts and retraining program participants.

Attitudes Toward Alternative Certification and Retraining Programs

Supervisors for alternative certification programs. School-based supervisors involved with alternative certification programs said that they are generally pleased with the quality of the candidates and supportive of initiatives to draw in teachers from nontraditional sources. A number of supervisors see the interns as what one termed "a shot in the arm" to an otherwise rather static system. A principal said that he would take an alternate route candidate over a traditionally prepared teacher any day.

Interviewers specifically asked whether the presence of alternate route candidates created extra burden for administrators and supervisors. Many

supervisors said no. Others realistically noted the difference between supervising traditional student teachers for eight weeks and mentoring alternate routers for a semester or a year. In the few instances where a candidate was truly struggling, administrators and supervisors seemed to be going out of their way to help that candidate succeed. Only one principal was clearly negative toward a program, stating that regular certification programs provided better preparation and far less burden on schools.

On a program-specific basis, some supervisors felt that overall coordination left something to be desired. A principal related a situation where she advised an intern to handle a classroom management problem in a certain way, only to learn later that she had directly contradicted advice given in the instructional component of the program. This administrator claimed to have never seen even an outline of the interns' coursework. A mentor teacher suggested that the idea of alternative certification was wonderful but that the entire training program should be turned over to the LEA, thereby eliminating the confusing requirements layered on by the state and institutions of higher education.

Supervisors for retraining programs. Supervisor interviewees for the three retraining programs had considerably less intimate knowledge of participants' classroom performance than those who supervised alternative certification candidates. As experienced teachers, retrainees were subject to little observation of their teaching. For the most part, we relied on the assessment of instructors in the retraining programs concerning the adequacy of participants' preparation for teaching math or science.

Two of the retraining programs took a distinctly nurturing attitude toward the retrainees. Tutorials and workshops were provided above and beyond

the regular coursework to help participants cope with new material. Administrators and instructors in these two programs also seemed to believe that most candidates could and would make it through.

In contrast, the third program reflected different attitudes and was losing a majority of those who entered. University level program administrators in both the math and science areas stated their shared beliefs that (1) people able to master math and science do so at the undergraduate level and (2) teachers have an attitude problem that prohibits them from making the time commitment necessary for adequate retraining. Two of the interviewed participants from this program will finish this summer. The third dropped out for a year but plans to re-enter this fall.

Regular teachers. Interviews were conducted with 12 regularly certified teachers in schools where alternative certification or retraining program participants were placed. One regular teacher was negative toward alternative certification, claiming that liberal arts graduates are not appropriate teachers at the elementary level and that their classroom management skills are poor. Another teacher did not realize that the program participant with whom he had contact was an alternate router. The remaining 10 teachers had positive attitudes toward the particular retrainees or alternative certification candidates whom they knew. Two reported initial skepticism but had changed their opinions.

Despite the generally positive attitude of the regular teachers we talked with, program participants and their supervisors provided anecdotal evidence indicating considerably more resistance to the new programs. Several participants reported comments from teachers to the effect that alternate routers "had it easy" in comparison with the veteran teachers' own training. One young woman effectively silenced this type of criticism by describing her

grueling schedule of full time teaching and accumulating 200 hours of instruction in a 12-month period.

Two mentor teachers expressed disgust with the attitudes of other teachers in their schools toward the interns. One refused to mentor another intern in the future because of the effects of such negative attitudes on a beginning teacher. The other dismissed the griping of her colleagues as jealousy toward a young teacher who they realized would be a better instructor than they could ever hope to be.

Interns in one school district reported that the local NEA affiliate had opposed the creation of the alternative certification program. While the NEA's position had modified, pockets of resistance remained. The interns said they were not made uncomfortable in the schools in which they were placed.

V. DISCUSSION AND CONCLUSIONS

Are alternative certification and retraining programs having an impact on resolving the teacher quality and quantity issues that led to their development? The literature review for this study indicates that, in fact, not much is yet known about the effectiveness of these strategies. In the absence of information about outcomes, reactions to the idea of such programs are largely rooted in beliefs. The contribution of this study is to look beneath the surface of the terms "alternative certification" and "retraining" to the heart of what programs falling under these rubrics actually do and to whom. Based on preliminary evidence, the following are our summary observations.

- Alternative certification programs are a viable means for effectively preparing quality teachers for some proportion of current and future teacher openings.

All the alternative certification programs examined seek to recruit and induct the best available and interested teacher candidates. Most are tapping local or regional labor markets, although at least two have expanded recruitment efforts to the national pool of graduates of selective liberal arts colleges.

These are selective programs. The degree of selectiveness depends on program size, local needs, and the general standards of the involved institutions of higher education and local educational agencies. Smaller programs have a higher applicant-to-participant ratio and more stringent selection procedures. The two programs associated with highly selective institutions of higher education apply the standards of the larger organization to the alternative certification program as well. Another institution of higher education may be using higher standards for its alternate route

program than it does for its regular undergraduate and graduate students. The whole state and large city programs are attempting to deal in larger numbers and appear to be somewhat less selective.

All the alternative certification program participants interviewed for the study were rated above average in content area preparation by their supervisors. Most were also rated above average as beginning teachers in comparison with their traditionally prepared peers. They are generally described as mature, motivated, and thoughtful people who have made a deliberate decision to embark on a career in teaching.

Alternative certification programs are clearly not the whole answer. Assuming that all the participants who enrolled in the seven programs in 1985-86 completed the requirements and found teaching positions, nearly 700 new teachers would have entered the workforce, over 60 percent of them in urban areas where shortages are reported to be highest. This is a significant contribution to maintaining the balance between teacher supply and demand in local and regional areas. Put in the national context, 700 additional teachers represents 2 percent of the estimated need for 29,000 teachers beyond the estimated supply of new teacher graduates in 1987--the proverbial drop in the bucket (NCES, 1985).

- Alternative certification programs can be a useful part of the national effort to resolve issues of teacher quality and quantity.

Larger movements are afoot to re-examine and perhaps restructure the teaching profession. As an interim measure, alternative certification programs are entirely compatible with the major recommendations currently being explored.

The coalition of deans of education programs known as the Holmes group has suggested a three tier, hierarchical system for the teaching profession. The lowest level of instructors would consist of a rotating supply of liberal arts degree teacher apprentices who would serve a maximum of five years while either pursuing the master's degree that would allow them to become full members of the profession or deciding that teaching was not their true vocation. Teacher candidates being attracted to alternative certification programs qualify for this role. Furthermore, many of the university-based alternate route programs assign graduate level course numbers to the formal instructional component. Completers of these programs are often not far short of the master's degree that the Holmes group proposes as a passport to a teaching career.

A second major thrust of efforts to reform teaching is the possible introduction of a national system of licensure similar to the self-regulation practiced by professions such as medicine and architecture. The Carnegie Forum has recently formed a planning committee to help establish an independent National Board for Professional Teaching. Prototype assessment instruments and procedures are under development. In essence, the evaluations proposed would be part of the gatekeeping mechanisms for a hierarchical profession, as envisioned by the Holmes group.

Should such a radical restructuring of the teaching profession come to pass in the next decade, it is our impression that many of the alternate route candidates have both the interest and the competence to rise easily to full professional status. Based on the evaluations of their supervisors, a considerable number have the potential to eventually become master teachers. We suggest that the alternative certification programs have much information to share with the leadership of national reform efforts. The programs'

experiences with different forms of extended field work and their experiments with more supervision for beginning teachers are particularly relevant to some of the reform proposals under consideration. Their selection procedures may also be instructive in the context of initial acceptance into an apprenticeship role.

- Completers of alternative certification programs appear to have made a real commitment to teaching.

Because most alternative certification programs are quite new, this conclusion is by definition speculative. Better information will be available in another year or two. The program completers whom we interviewed all expressed a continued desire to teach and either had or hoped to have full-time teaching positions in the next school year. There is also a precedent for optimism.

The Master of Arts in Teaching (MAT) program is in many ways the forerunner of alternative certification. Like alternative certification, the MAT was developed as a response to issues of teacher quality and quantity arising out of the Sputnik crisis and the arrival at school of the baby boom in the late 1950s. Like the alternate routes, it also sought to attract well-educated individuals to the teaching profession through incentives such as shorter training and, in many cases, a paid internship and/or tuition assistance. The MAT had the added advantage of offering a graduate degree as well as a teaching credential.

A recent study of participants in the MAT programs at nine institutions during 1968 and 1969 sheds some interesting light on the professional longevity of nontraditionally prepared teachers. Among a sample of 715 respondents, 83 percent entered teaching upon program completion. Approximately

one-third of these individuals are currently teaching and many others remain employed in the broader field of education. Among the MATs who taught but have left teaching, the average tenure was five years (Coley and Thorpe, 1986).

Given the similarities between MAT programs and the alternative certification programs studied, it is not unreasonable to project a similar retention pattern over time.

- Initial skepticism about alternate routes among educators is likely to wane as contact with graduates of the programs broadens.

Our interviews indicate that the strong academic backgrounds and general maturity of participants in the alternative certification programs are often enough to ensure their personal acceptance among unconvinced colleagues and administrators. This then begins to spill over to greater tolerance of the program in general. On the other hand, we also heard of instances where the above average abilities or enthusiasm of alternate routers alienated peers.

In a very real sense, the early graduates of alternative certification programs are the emissaries. Overall, based on the quality of the candidates, we would expect discussions of the right of such programs to exist to rapidly become a nonissue.

- Retraining programs appear only partially successful as a resolution to local teacher shortages.

Our sample of retraining programs for in-depth examination was small. We are, therefore, wary of generalization. The following summary comments should be construed as impressions, rather than any definitive assessment of the potential for retraining to address local needs.

While retraining programs have application and selection procedures, they appear to be less selective than alternative certification programs. Interviews with participants do suggest, however, that some self-selection also takes places in terms of the motivation to persevere with difficult subject matter in the math and science fields. As many people will attest, the algebra, calculus, and chemistry we learned in high school and college atrophy with disuse. To exercise them requires a certain admirable persistence.

Retraining programs are realistic. They do not, as a rule, attempt to prepare teachers for upper level math and science courses. Rather, they are intended to equip teachers of average competence as instructors at the introductory level in a field, thereby releasing more qualified specialists for intermediate and advanced assignments. Retrainees with a real aptitude and interest are free to go on for a master's degree in the new certification area. Some whom we talked with have done so.

One of the three programs studied has, over the years, probably contributed a significant number of math teachers to a large city school system. For the others, it is too soon to estimate their impact. However, even with a very limited number of interviews, we were struck by the proportion of program completers who were <u>not</u> teaching in the area for which they retrained. For some, openings were not currently available in their home district. Others found that the retraining opened doors to new opportunities such as teaching at the postsecondary level or computer programming.

This perception raises questions about how retraining programs should evaluate their own success. Are their primary clients the individuals retrained or the local districts that claim teacher shortages? Is the proper unit of evaluation program completers or job placements <u>in the field of retraining</u>? If state-supported retraining programs require program completers

to teach in-state for a certain number of years for student loan remission, should retrainees be guaranteed the opportunity to teach in the area for which they retrained? Is the need for science and math teachers in a locality or state sufficiently well-documented to warrant retraining efforts targeted specifically and only at those areas? These are questions that we believe both program administrators and state and local policymakers must confront.

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APPENDIX A

STUDY METHODS

STUDY METHODS

This report is based on a literature review; printed descriptions of 20 alternative certification and retraining programs; and, for 10 of the programs, telephone interviews with program administrators, program participants and their supervisors, and regularly certified teachers who had contact with participants.

The literature review covered four areas: (1) documentation of the extent of teacher shortages; (2) recent state changes in teacher preparation and certification requirements; (3) professional standards for math and science teachers; and (4) assessment of teacher performance. The review provided context for why alternative certification and retraining programs have been developed and informed development of the unstructured interviews used to assess the programs. An annotated bibliography of sources addressing these areas appears as Appendix D to this report.

Assessment of Alternative Certification and Retraining Programs

Identification of programs. Starting with leads suggested by the literature review, the study team compiled a list of more than twenty alternative certification and retraining programs. Team members contacted each program by telephone to request written descriptive information and obtain an overview of its operations.

Based on this preliminary information, ten programs were selected for in-depth examination: seven alternative certification and three retraining programs. The selection process involved three primary criteria. First, it was necessary to consider program maturity because many of the alternative certification or retraining programs are in the development or start-up phase. This study focuses on programs that had "graduated" at least one cycle of participants by the summer of 1986 when information was collected.

The other two selection criteria applied were the locus of administrative control of a program and the uniqueness of the model. Alternative certification and retraining programs are administered by various combinations of a state educational agency (SEA), local educational agencies (LEAs), and institutions of higher education (IHEs). The sample reflects this diversity. While the programs have enough similarities to allow comparison, many have unique features such as the involvement of business and industry or the placement of participants in classrooms in pairs for the internship segment of their training. Programs also vary with regard to the amount of formal coursework required, the length of the internship or student teaching period, provisions for participant support (financial and psychological), and sources of funding.

Table A-1 depicts the program type, locus of control, and length of time in operation (as of the summer of 1986) for the final sample selected.

Table A-1
Sample of Alternative Certification and Retraining Programs

Location	Program Type	Control	Program Maturity
Arizona	Alt. Cert.	SEA	1 year
Harvard University	Alt. Cert.	IHE	3 years
Houston	Alt. Cert.	LEA	1 year
Los Angeles Unified School District	Alt. Cert.	LEA	2 years
New Jersey	Alt. Cert.	SEA	1 year
Santa Fe	Alt. Cert.	LEA/IHE	1 year
University of Southern Maine	Alt. Cert.	IHE	4 years
Delaware	Retraining	SEA	1.5 years
Long Island University	Retraining	IHE	9 years
Los Angeles County	Retraining	SEA/County	2 years

Detailed descriptions of these ten programs appear as Appendix A to this report. Appendix C contains brief overviews of the identified alternative certification and retraining programs not included in the in-depth sample.

Interview samples. For each of the ten programs, the study team attempted telephone interviews with four types of individuals: program administrators, program participants, supervisors/mentors of program participants, and regularly trained teachers in schools where program participants were placed for their field training or as beginning teachers after their training was completed. In some cases, an individual was able to fill two respondent functions, such as program administrator and supervisor.

Program administrators provided the names of program participants and/or local school districts where participants were placed. For each program, at least two participants were interviewed. We deliberately selected participants who had been placed in schools or school districts with several other trainees on the theory that the interviewees therefore would be able to compare and contrast their own experiences in the program with those of other participants whom they saw frequently.

Program participants provided the names of two supervisors who could evaluate their performance. The types of supervisors interviewed included building principals, supervising or mentor teachers, and staff from institutions of higher education.

Depending on whether the program offered alternative certification or retraining, the evaluative questions asked of supervisors differed, as did the types of supervisors who could provide the best information. Evaluation of participants in alternative certification programs centered on their preparation for teaching and managing a classroom; building-level supervisors were the main sources of information. For participants in the three retraining programs studied, performance evaluation focused on the adequacy of their preparation in a new content area and came principally from college or university instructors. Several instructors were able to comment on more than one

retraining participant. The reason for this different approach was that retraining programs differ significantly from alternative certification programs in the amount of supervision and general support provided. Retrainees are experienced and, frequently, tenured teachers. When they take on a new teaching assignment as a result of their recertification, they do not receive supervision in the way that a beginning teacher would. Building principals and department chairpersons, therefore, are unlikely to have observed retrainees in the classroom unless they have learned of a problem.

For each participant, one of the supervisors interviewed identified a regular teacher in the same department or at the same grade level who had not served in a supervisory capacity. Interviews with regular teachers were designed to gauge the attitude of traditionally prepared staff toward new strategies for professional training.

Because data collection for this study took place in the summer, when many schools are closed and personnel are on vacation or at professional conferences, completing all the planned interviews proved impossible. In some cases, only one supervisor was interviewed for a participant. Regular teachers were particularly elusive. However, participants and building-level supervisors commented on general departmental or overall faculty response to the program and the individuals in question.

Altogether, 76 telephone interviews were completed as follows:

Respondent	Number of Interviews
Program administrators	10
Program participants	24
Supervisors	30
Regular teachers	12
Total	76

Interview procedures. All interviews were unstructured. Program administrators were asked to describe the essential elements of their program, including recruitment, selection and application procedures, training provided, program and participant evaluation procedures, costs, and funding sources.

Program participants answered questions about their age; educational background; previous experience; motivation for entering the program; and experiences in the program with regard to formal instruction, field experiences, and supervision and support.

Supervisors associated with retraining programs were asked to comment on participants' mastery of subject matter and the adequacy of their preparation for teaching math or science. Supervisors of alternative certification candidates focused on factors related to subject matter competence, teaching strategies, planning for instruction, monitoring pupil progress, classroom management, and relationships with students and colleagues.

Regular teachers discussed their own educational background and teaching experience, their attitudes toward alternative certification or retraining programs generally, and their assessment of a particular participant's teaching competence.

Data analysis. Very few programs have yet produced reports or evaluations containing aggregated information on program participants or outcomes. Data analysis, therefore, relied heavily on the telephone interviews. Based on program administrators' descriptions, cross-program analyses were made in the following areas:

- content area orientation
- organizational participants
- enrollment
- attrition rates
- program components
- sources of funding
- program costs

Information obtained from the telephone interviews with program participants, their supervisors, and regular teachers permitted analyses along several dimensions:

- the age, undergraduate major, and previous employment history of program participants
- motivation for entering the program
- strengths and weaknesses of the programs
- experiences with students, colleagues, and administrators
- program outcomes
- attitudes toward alternative routes to certification

APPENDIX B

DESCRIPTIONS OF TEN
ALTERNATIVE CERTIFICATION AND RETRAINING PROGRAMS

Alternative Certification Programs

I. Arizona Partners Project B-1
II. Harvard Graduate School of Education Midcareer Math and Science Program B-5
III. Houston Alternative Certification Program B-8
IV. Los Angeles Unified School District Teacher Trainee Program B-12
V. New Jersey Provisional Teacher Program B-16
VI. University of New Mexico/Santa Fe Public Schools Intern Program .. B-22
VII. University of Southern Maine Teachers for Secondary Schools Program B-26

Retraining Programs

I. Delaware Retraining Programs B-30
II. Long Island University Mathematics Retraining Program B-35
III. Los Angeles County Mathematics Teacher Retraining Program B-39

ALTERNATIVE CERTIFICATION PROGRAMS

I. Arizona Partners Project

The Arizona Partners Project, which began in the summer of 1985, has just completed its first year. The program consists of a partnership among local school districts, Arizona State University (ASU), state government, and industry. It is an adaptation of a model developed at the University of Massachusetts. The program had twenty-two participants in the first year; because of funding difficulties, only six are enrolled for the second cycle.

Stimulus for the program came from local school superintendents who were contending with teacher shortages. The program enables local school districts that have science and math vacancies to fill each of them with two interns, one for each semester. ASU provides the formal training and state government allocates some of the funding. Corporations provide the participants with paid internships for one semester and the option of guaranteed employment for the second summer. The participating industries also established a foundation that provides additional funding for the program.

The first year has been a very difficult one for the Partners Project. ASU underwent a reorganization and several changes in deans and assistant deans. A key LEA representative also changed positions in midcourse. Funding delays exacerbated the problem. Nevertheless, the project survived because of the importance placed on it by the participating institutions.

Program Goals and Expectations

The Partners Project was originally designed to address teacher shortages and to enrich and enlarge the teacher talent pool for the public schools. A more subtle purpose was to serve the perceived need on the part of corporations to develop teachers with empathy toward industry.

When planning for the program began in 1984, school districts in the Phoenix area were experiencing teacher shortages in science and math. IHEs reported that few individuals were training to teach in these subjects. Currently, the region has a sufficient number of science and math teachers because teaching has become a more attractive profession, especially with the decline in the oil and engineering fields. However, increased shortages are expected in the future because the state recently has raised its high school graduation requirements. The changes are being phased in beginning at the junior high level. It is probable that more teachers will be needed for the additional courses.

A further goal of the Arizona Partners Project was to attract highly qualified individuals to the teaching profession by providing them with an alternative way to obtain certification. At the time the program was being developed, the only way for a liberal arts graduate to get teaching credentials at ASU was to attend a four semester undergraduate program.

The Partners Project has undergone a number of changes between its first and second years of implementation. The first group to participate had the option of earning a master's degree as well as teacher certification; for participants in the second cycle, a master's degree is not an option. Other changes are detailed in the program description.

Recruitment, Application, and Selection

Recruitment: The assistant dean at ASU made a presentation at a national convention of career placement personnel from small colleges. Program administrators then made personal visits to interested colleges and talked with science and math majors in the upper division. Ads were also placed in local newspapers.

Application: For the first cycle, applicants had to meet all the entrance requirements for the Graduate College of Education at ASU because they had the option of earning an M.Ed. degree. Candidates were required to have a minimum grade point average (GPA) of 3.0 with a science background and had to submit scores for either the GRE or the Miller Analogies Test. A written essay on the applicant's reason for wanting to enter the teaching profession was also required.

Approximately 100 applications were received for the first cycle. Recent liberal arts graduates constituted about 80 percent of the applicants.

Selection: The number of applicants accepted was partially dependent on LEA needs. For each student admitted into the program, a participating LEA had to have a vacancy in the student's subject area and a projected double opening in the area for the following year. (A projected double opening was necessary in order to guarantee jobs for both interns in a particular position.)

Selection was made by a steering committee consisting of a representative from ASU, at least one representative from industry, and a superintendent and/or personnel representative from each participating LEA. Most of the selected students far exceeded the college minimums.

Since participants in the second cycle will not earn a graduate degree, scores on the GRE or Miller Analogies Test are not required. The minimum GPA is 2.5, which conforms to standard ASU policy, but all participants did meet the graduate college requirement of 3.0.

The Program

Overview: For the first group of participants, a total of 45 credits is needed to earn a master's. During the first summer, students completed twelve credits in education at ASU and observed in classrooms for four hours every day throughout the term. In the fall, half of the participants were placed full time in a public school classroom; the remainder had internships in industry. For the spring term, the internships were reversed. The interns also took six credits of coursework in both the fall and spring terms. At the end of the spring term, participants were eligible for certification. If they

continue through the second summer they can receive the M.Ed.; 10 out of 22 participants in the first cycle have chosen this option. The remainder have chosen guaranteed employment in industry for the summer. First cycle participants have up to five years to complete the master's.

Formal Instruction: During the first summer, students take specially designed education courses which are based in part on Madeline Hunter's "Elements of Instruction," a model of teacher education that is increasingly popular. [See Appendix D, Annotated Bibliography.] Topics covered include classroom management, methods, adolescent psychology, planning, curriculum development, and evaluation. The twelve credits taken during fall and spring cover reading in the content areas (a state requirement), school and society, assessment, and curriculum development.

Field Experience: Participants are divided into two equal groups. One group has an internship in a public school classroom during the fall and an industrial internship during the spring. The second group has its internships in the reverse order. All internships are full-time placements.

Supervision: Because of a delay in funding, ASU had some difficulty providing supervision for the school internships during the first semester. A Partners Project supervisor was hired by ASU for the second semester. District supervision was carried out on an informal basis; a mentor teacher program is being planned for the second cycle. A retired business executive provided supervision for the industrial internships; participating corporations also identified a mentor for each participant. A retired school superintendent served as a school-community liaison, a position that will not be continued in the second cycle. The foundation established by participating industries sponsored the two retired supervisors.

Evaluation of Participants: During the school internship, standard district evaluation procedures are used to assess the participants. General skills are evaluated in the corporate internship.

Post-program Placement: All of those who earned certification and wanted to teach have teaching jobs for the fall of 1986. All jobs are in Partners Project LEAs but are not necessarily in the LEAs in which the participants did their internships.

Program Evalaution: No formal written evaluation has been undertaken because the first cycle is not officially completed.

Of the 22 participants in the first cycle, 18 have become certified. Ten of these are taking coursework toward their master's. The rest have five years to complete their degree.

Although it was not set up for the purpose, the Partners Project has served as a model for a new post-bachelor's program established at ASU. Participants in the second cycle will take fall and spring courses jointly with the post-bachelor's students.

Financing of the Program and Program Participants

For the first cycle, participants received full salary and benefits for half a year during their school internship and eleven dollars per hour during their corporate internship. Each received a $3,000 forgiveable loan, funded through the foundation, to cover the tuition costs for the first summer. Each is expected to teach for three years or pay back the loan. ASU provided a tuition waiver for the fall and spring courses. All participants have the option of guaranteed employment in industry for the second summer. Because of state budget considerations, loans are not available for the second cycle; tuition waivers are under consideration.

The total cost of the program in its first year is estimated to be approximately $178,000. Arizona State University's budget was $156,000. Of that amount, $48,000 was allocated to instructors' salaries, $25,000 to tuition waivers, and $66,000 to forgiveable loans. Lesser amounts were budgeted for recruitment, clerical support, travel, project coordination, and other expenses. The school district budget was $22,000, including $20,000 for administrative expenses and $2,000 for recruitment.

II. Harvard Graduate School of Education Midcareer Math and Science Program

The Harvard Midcareer Math and Science Program (MCMS) was established in 1983. It provides teacher training to professionals with science and quantitative backgrounds who want to switch to careers as secondary school teachers. The program has grown from an initial class of six to a fourth year class of twenty-eight.

Program Goals and Expectations

Impetus for the MCMS program came from the new dean at Harvard, Patricia Albjerg Graham. One of her goals was to have Harvard return to teacher training which had been terminated in 1972. She also wanted programs that were innovative and could be used as models. At the time, the shortage of math and science teachers was just surfacing; it was decided, therefore, to design a model program to address this need. The innovative feature of the MCMS program was that it tapped a new pool of potential teachers: experienced professionals who wanted to change careers.

Recruitment, Application, and Selection

Recruitment: Harvard uses a variety of approaches to recruit applicants. Articles are placed in professional journals, alumni bulletins, and Boston area newspapers. Job placement and out-placement firms in the Boston area are contacted, as are personnel directors and retirement counselors in businesses with high concentrations of employees with scientific and mathematical backgrounds. Announcements are also made through professional organizations. These publicity efforts have yielded over 600 inquiries annually about the program.

Application: Applicants must have a bachelor's degree and prior coursework in math, science, or engineering. (In most cases, their prior degrees would be in these fields.) Scores from the GRE or the Miller Analogies Test must be submitted, but cut-off scores are not used in selecting students. A written statement of purpose on why applicants want to be in the program is heavily weighted in the selection process. Applicants must have either a telephone or personal interview and submit three recommendations.

Selection: Final selection is made by a committee composed of the program director, program faculty, and members of the School of Education admissions staff.

For the three years in which the program has operated, the following admissions information has been compiled:

	83-84	84-85	85-86
Number applied	14	33	46
Number admitted	9	21	29
Number enrolled	6	18	20

Program participants have included a microbiologist; a biochemist; chemical, civil, and aeronautical engineers; a meteorologist; several technical researchers; and a retired rear admiral. Many have earned graduate degrees, including the doctorate, before entering Harvard's program. The average age of participants is 40 with a range of 26 to 62. Mean GRE scores are 618 on the verbal section and 634 on the quantitative.

The Program

Overview: Although both full-time and part-time study are available, most participants choose to attend on a full-time basis and complete the program in nine months. During the fall, they take five courses and a 60 hour pre-practicum observation. The spring semester consists of one course and at least 300 hours of student teaching.

Formal Instruction: Required courses for the fall semester are: Improving Schools, Teaching and Learning, and Teaching Mathematics and Science in Secondary Schools, Part I. Participants choose two electives from the entire university course offerings; adolescent development is often recommended. Teaching Mathematics and Science in Secondary Schools, Part II is required during the spring semester. Participants who want to update their knowledge of their substantive areas may do so through electives or by taking additional courses in the summer.

Field Experience: A 60 hour pre-practicum experience, required by the state, has been linked to the fall semester courses. During the second semester, participants are placed in full-time student teaching assignments for about twelve weeks.

Supervision: A university supervisor and a cooperating practitioner are assigned to each participant. University supervisors must have: (1) three years of full-time teaching experience; (2) demonstrated ability with teacher supervision; and (3) subject matter expertise. Most are doctoral students but a few are administrators or classroom teachers in the school in which the participant is doing student teaching. The university supervisor conducts five full class observations using a clinical model of supervision.

Program administrators carefully select the cooperating practitioners. Most are certified teachers but those in private schools may not be. No special training has been given to cooperating practitioners; this is being considered for next year. Two cooperating teachers have also been hired by the program to assist in the methods course.

Evaluation of Participants: During the practicum, the state requires that three conferences be held with the university supervisor, cooperating practitioner, and student teacher. The state has five standards for student teaching. At the end of the practicum, both the university-based and the school-based supervisors must sign off on all five standards in order for the program participants to be certified.

Post-program Placement: All participants from the first two years who sought teaching jobs were placed. Third year participants are in the midst of their job search.

Program Evaluation: At the end of the second year of the program, an evaluation was done by an outside research firm. The final report was intended for program administrators only, but a version is being prepared for public dissemination. In November 1985 and March 1986, informal telephone surveys were made of all participants. They were asked what they were doing, how things were going, what had helped them from the program, and what was not addressed. A formal report based on these surveys is in preparation.

Financing of the Program and Program Participants

Students must pay full tuition to the Harvard Graduate School of Education--about $10,200 for the 1985-86 school year. All participants are eligible for grants and loans. Qualified MCMS participants may also receive special scholarships. Support from foundations and corporations is available for individual students but not for the program as a whole.

No budget information was available.

III. Houston Alternative Certification Program

The Houston Alternative Certification Program (ACP) began in the summer of 1985 under the auspices of the Houston Independent School District (ISD). It was designed to comply with the state requirements that participants in alternative certification programs serve a one-year internship under the supervision of an experienced, certified teacher, and that they receive teaching method and classroom management training as required by the Texas State Board of Education. The program had approximately 330 participants in its first year; about 100 are enrolled in the second year.

Program Goals and Expectations

The ACP program has three purposes: (1) to fill some of the teacher vacancies in the Houston school district; (2) to attract quality candidates to the teaching profession; and (3) to facilitate the candidates' acquisition of needed teacher training and certification.

For the 1985-86 school year, Houston had a documented need for 2,000 additional teachers. Areas with acute shortages were bilingual/ESL programs; prekindergarten through fifth grade; and secondary English, mathematics, and science. The ACP program was intended to be one mechanism for filling these vacancies.

Recruitment, Application, and Selection

Recruitment: The Houston ACP program is designed for: (1) business professionals who want to change careers for personal fulfillment or because of a decline in the local economy; (2) retiring armed forces personnel; and (3) homemakers. Special efforts are made to attract qualified Hispanics.

A number of community organizations and agencies serving Houston area professionals have participated in the recruitment efforts. Company personnel counselors, service organizations, civic clubs, and churches are among the groups contacted. The program is publicized through flyers and talk show interviews. These activities have produced over 5,000 requests for applications.

Application: Minimum requirements for the program include a bachelor's degree, a grade point average of at least 2.5 in the subject area to be taught, and between 18 and 24 semester hours in particular subject areas depending on the grade level and program in which the candidate wants to teach. Applicants for elementary positions must have six semester hours of reading. Arrangements have been made with Houston Community College to provide courses that interns are most apt to need.

Selection: Candidates who meet minimum requirements must pass a basic skills test--either the Pre-Profession Skills Test or the Fundamental Academics Skills Test. Houston requires slightly higher passing scores on these tests than the state requires. Individuals wanting to teach at the secondary level must also take a subject area test which is used only for advising and recommending remediation.

An individual's social and psychological fitness for teaching is determined in part from a general interview and Selection Research, Inc.'s "Teacher Perceiver Interview." In addition, reviews are made of the individual's work history and personal references. A criminal record search is also conducted.

The Program

Overview: During a preassignment orientation, participants receive about 40 hours of training and 25 hours of student contact experience. Upon completion of the orientation program, a review is made of each candidate to determine if he or she is ready for a contract offer or needs further training and/or contact activities. Some interns leave the program at this stage if they have determined that a teaching career is not for them.

An intern who is offered a contract generally receives an assignment as a "teacher of record," filling one of the district's critical vacancies. This one-year internship involves full-time teaching responsibilities. If such a placement is not available, the individual serves as a permanent substitute pending a suitable assignment or as a supernumerary assigned to a cluster manager. Interns also receive an individualized training program of about 100 hours that consists of 15 to 20 self-contained modules.

Formal Instruction: All participants receive the same preassignment training program. Topics covered during the 40 hour program include lesson planning, classroom management, curriculum requirements, learner characteristics, and local district policies. Instruction is provided by LEA personnel.

Formal training during the internship consists of 15 to 20 modules selected to meet the individual needs of participants. Since most interns have strong content backgrounds, most modules center on pedagogical skills that can be immediately applied in the classroom. The 50 available modules fall under the general categories of content area teaching, curriculum, classroom management, methods and strategies, parental involvement, special learners, legal/ethical aspects of teaching, and orientation to Houston ISD. Training is provided by LEA personnel or through mediated instruction such as videotapes and audiotape recordings.

Field Experience: During orientation, participants receive about 25 hours of student contact experiences beginning with observations at the grade level or in the subject area in which they wish to teach. Other forms of student contact experiences include tutoring in an after school program, serving as a teacher aide, and substitute teaching. Some interns receive an additional seven hours of preassignment training if they need experience in different subjects in the same content area, in different grade levels, or with a different school community such as one with a large minority population.

After completion of the orientation program, a participant is placed as a teacher of record when a critical vacancy occurs in an area that matches the individual's academic qualifications. The principal must agree to accept the intern on the faculty. Internships are full-time assignments lasting one year.

Supervision: Each intern is matched with a supervising teacher who must have achieved a certain level on the district career ladder and must demonstrate an interest in training degreed professionals to become teachers. The supervising teacher provides day-to-day assistance to the intern. Additional support is provided by the principal, the department or grade level chairperson, the secondary dean of instruction or elementary instructional supervisor, and the ACP staff. Interns may also receive assistance from an advisory committee composed of exemplary classroom teachers, outstanding administrators, teachers who have taught with emergency credentials, and, after the pilot year, teachers who have completed the ACP program.

Evaluation of Participants: Primary responsibility for intern assessment rests with the supervising teacher under the direction of the principal. The supervising teacher provides day-to-day assistance to the intern and must observe at least twice a month. Formal observations, which are part of the Teacher Quality Assurance Program, are conducted by the principal, the dean of instruction, and ACP staff members. Videotapes of the interns in the classroom may also be utilized.

Trainer rating sheets are used to assess the training modules. Each intern is expected to achieve the competency level specified for each module. ACP staff review notebooks documenting each intern's training experiences. Interns who have met all district requirements will be recommended to the state for appropriate certification. Their contracts will be renewed with Houston ISD and their internship will be counted on the career ladder. Interns who have not met all district criteria will receive a growth plan that describes the additional training necessary for eventual certification.

Program Evaluation: The Department of Planning, Research, and Evaluation of the Houston Independent School District is evaluating the ACP program. The evaluation will include a survey of program participants on the effectiveness of the training modules and internship supervision and also a survey of principals and supervisors.

Two types of product data will be considered in the final evaluation. First, personnel assessment ratings of the interns will be compared to those of a sample of first-year teachers who have certification. Second, achievement data for students taught by interns will be compared to achievement data for students of a sample of first-year certified teachers.

About 200 of the 330 first year participants are expected to complete the program. Approximately 50 have dropped out because they have decided that teaching is not for them. Another 50 have left for reasons such as a spouse being transferred to another city. A few participants will not be recommended for certification and some will receive additional training.

Financing of the Program and Program Participants

During the orientation program, participants are paid to attend the training sessions and to work as aides or substitutes. They receive no payment for classroom observation. As teachers of record, interns are paid at the full salary level for beginning teachers. The school district provides all funding for the program.

The program's total budget was $552,365 from June 1985 through April 1986.

IV. Los Angeles Unified School District Teacher Trainee Program

The Los Angeles Unified School District Teacher Trainee Program has been in operation since 1984. It was authorized by California's Hughes-Hart Educational Reform Act of 1983, which enabled local school districts to employ teacher trainees in order to address the continuing shortage of teachers in certain secondary subject areas. Districts are required to develop, approve, and implement professional development plans for the trainees. In the Los Angeles Unified School District (LAUSD), approximately 160 trainees entered the program during its first year and 90 in the second year. The district is currently recruiting for its 1986 entering class of approximately 150 new trainees.

Program Goals and Expectations

The Teacher Trainee Program is designed to serve two purposes: (1) to fill teacher slots in shortage fields by offering a second career for individuals with degrees in the shortage field areas, and (2) to provide a vehicle for alternative certification through a quality program.

The Los Angeles Unified School District has a documented need for about 2,500 replacement teachers annually, especially in the areas of math, science, English, and social studies. In previous years, only 500-600 newly hired teachers were fully certified, indicating a high level of emergency certification. The teacher trainee program is viewed as a viable alternative for addressing the shortage.

Recruitment, Application, and Selection

Recruitment: The Los Angeles Unified School District recruits applicants to the Teacher Trainee Program through advertisements and presentations at universities. In general, there are two to three applicants for each available slot. The district is primarily interested in recruiting recent college graduates in math, science, and English.

Selection: Eligibility for the program requires a bachelor's degree with 20 or more units in the subject area to be taught and a passing score on both the California Basic Educational Skills Test (CBEST) and the National Teacher Examination (NTE) Specialty Area Test or, in 1984-85, an appropriate district subject matter test. An individual must also meet all the district's employment standards, complete the proper forms, and submit college transcripts.

Applicants who meet the initial admissions criteria must participate in an oral interview conducted by several principals. Once an applicant is approved by the committee, he or she may apply for a position at a school and is interviewed by the building principal. Admission into the program is not ensured until a prospective trainee has a position on a faculty.

While LAUSD does some recruiting among mid-career professionals, the majority of its applicants to the Teacher Trainee Program are recent college graduates without teaching credentials.

The Program

Overview: In order to meet the state's requirement for providing a professional development plan for all teacher trainees, LAUSD created the Teacher Training Institute, which is coordinated by the district's Human Resources Development Branch. Two types of training are provided: (1) "hands on" classroom and demonstration training and (2) formal instruction. Specific responsibilities of the trainees include:

- Attending pre-school year orientations and regularly scheduled classes
- Working cooperatively with assigned mentors
- Fulfilling academic (class) responsibilities
- Carrying a full teaching load and all attendant school responsibilities

Formal Instruction: Teacher trainees have two options for formal instruction: (1) a 32 unit program at the California State University at Los Angeles or Northridge, resulting in a master's degree and teaching credentials or (2) a 19 unit program (including salary credits) with the district. Ninety percent of the trainees have chosen the district option.

The formal instructional program takes place over a two year period and includes a summer pre-service component as well as late afternoon classes during the school year. Instruction takes place in the following areas:

I. The Teaching/Learning Process (128 hours)

A. Psychological aspects
- Understanding how learning occurs
- Classroom and behavior management assessing; diagnosing and reporting achievement

B. Instructional processes
- Effective instructional techniques
- Curriculum development, alignment and instructional materials
- Bilingual/ESL and other language development instructional practices

II. Practice in Teaching Skills (64 hours)

III. Planning the Instructional Environment (96 hours)

- Working with aides, parents, and the community
- Orientation to the district
- Multicultural education: general
- Multicultural education: specific

Academic instruction through the LAUSD Teacher Training Institute is provided by experienced teachers who are designated "class leaders." The class leaders are selected on the basis of criteria developed by LAUSD staff. All are classroom teachers or teacher advisers who have a proven record in training activities. They must be approved by their principal and the regional superintendent. The Staff Development Branch has established a "trainer of trainers" program for both class leaders and the mentor teachers who work with trainees in the classroom.

Field Experience: Teacher trainees receive direct demonstration training in the classroom under the supervision of a mentor teacher. Trainees carry a full teaching load with all attendant school responsibilities.

Supervision: Teacher trainees are supervised in the field by both a mentor teacher and the school principal. The principal has primary responsibility for evaluating the trainee. The mentor teacher is expected to assist the trainee in an informal way and to serve as liaison between the trainee and the school principal.

A program administrator stated that in a school where the program is working well, the supervisory team supervises teacher trainees, articulates a way in which to effectively help new teachers, and provides for at least three conferences among the trainee and the evaluating administrator, department chairperson, and mentor teacher.

Evaluation of Participants: The principal is primarily responsible for evaluating the trainee. The evaluation differs from that of a regular teacher in that more consideration is given to the "on the job" nature of the trainee's role. Principals also assist trainees in understanding the purposes and procedures of the evaluation process.

Post-program Placement: Teacher Trainee Program participants must be placed in a school before they can begin the program. The district bases its admission decisions on the number and types of job openings.

Individuals who successfully complete two years of service as a teacher trainee, take and pass the appropriate district evaluation processes, and are asked to serve in certificated positions the following year are reclassified as probationary teachers. Seniority status is established based on the beginning of the probationary year. The first cycle of participants is eligible for probationary status in the 1986-87 school year. No figures are yet available on the number of trainees who will return for the third year.

After the third year of service, a teacher who is asked to return will become a permanent employee of the district.

Program Evaluation: There has been no formal program evaluation of the Teacher Trainee Program in the Los Angeles Unified School District. The Superintendent of Schools is required to report to the Board of Education's Personnel and Schools Committee on the teacher trainee program. The memoranda submitted over a two year period indicate that little modification has been made to the original training plan.

Program administrators estimate a 90 percent completion rate. The attrition rate of about ten percent is less than the attrition rate for new, regularly certified teachers.

Financing of the Program and Program Participants

The Los Angeles Unified School District pays both the salaries and tuition for teachers who choose the district-sponsored training option. Trainees who work toward a master's degree at an institution of higher education are responsible for their own tuition.

The total budget for the first two and one-half years of the program was $366,800. The Superintendent of Schools has requested a total of $273,596 for 1986-87 and 1987-88. The largest item in the program's budget is stipends for class leaders and mentor teachers and other instructionally related activities.

V. New Jersey Provisional Teacher Program

The New Jersey Provisional Teacher Program was proposed by the SEA in 1983 and approved by the state legislature in 1984. The first program participants were placed in classrooms during the 1985-86 school year. As of June 1986, 184 provisional teachers were employed under the program throughout the state. Recruitment and selection of the second wave of participants is currently under way.

Program Goals and Expectations

The Provisional Teacher Program is intended to accomplish two goals: (1) replace the practice of emergency certification with a far more rigorous, alternative entry route to the teaching profession and (2) improve the quality of entrants to the profession by providing local school districts with a means to employ talented college graduates who were not teacher education majors.

Removal of the emergency certification option was instituted simultaneously with the introduction of the provisional teacher program. Local districts in the state may now hire from two pools: state approved alternative certification candidates or regularly certified teachers emerging from teacher education programs. There is no requirement that districts hire regularly certified teachers over those who have taken the alternative route. Districts may hire teachers with emergency certification in only three areas: bilingual education, special education, and vocational education.

Although the Provisional Teacher Program is frequently spoken of in the context of educational innovations, its architects in the New Jersey State Department of Education view it as essentially conservative in the sense that they designed it to replace the open door policy implicit in emergency certification with a pool of screened candidates.

Recruitment, Application, and Selection

Recruitment: The SEA maintains a small Office for Teacher Recruitment. It has focused its energies on recruiting new liberal arts graduates from selective colleges to the New Jersey teacher pool. During the 1985-86 school year, the office contacted a total of 54 colleges and universities with regard to the Provisional Teacher Program. Visits were made to a considerably smaller number of institutions.

Other groups whom New Jersey hopes to attract to the teacher pool include minorities and mid-career people. College alumni organizations and their publications are viewed as avenues for reaching these targets.

Application: All applicants to the provisional teacher pool must hold a baccalaureate degree with a 30 credit major in the subject area to be taught. Applicants submit an application, including a college transcript, and a $30 fee. Those whose initial credentials are approved receive notification that they have been "endorsed" to take an appropriate subsection of the National

Teacher Examination (NTE). The NTE is currently offered about once per month. Attainment of the minimum required score on the NTE qualifies the applicant for a "Statement of Eligibility" from the state, allowing him or her to seek employment as a teacher in a particular subject area in any of the state's 600 school districts. An individual candidate can be approved in more than one field.

In September 1985, the SEA had received about 1,300 applications, of which 1,013 were complete enough to be included in the state's first profile of the provisional teacher pool. The following table describes key characteristics of the candidates who qualified on the basis of undergraduate degrees.

Characteristics of the General Pool of Applicants
New Jersey Provisional Teacher Program
Through September 1985
(N = 1,013)*

Variable	Percent
Undergraduate education	
In-state college	43%
Out-of-state college	57%
Highest degree held	
Bachelor's	77%
Master's	17%
Doctorate or MBA	6%
Year undergraduate degree received	
1985	8%
1980-84	37%
1975-79	21%
1970-74	13%
1965-69	9%
1960-64	7%
pre-1960	5%
Undergraduate major	
Social sciences (combined)	21%
Natural sciences (combined)	19%
English	14%
Business	9%
Mathematics	8%
All other	29%
Prior teaching experience	
Substitute teacher	16%
Full-time, private school	10%
College professor	7%
Tutor (including music/dance)	3%
College teaching assistant or teacher aide	5%

* Source: "A Profile of Applicants to New Jersey's Alternate Route to Teacher Certification," New Jersey State Department of Education, October 1985.

According to these statistics, the majority of provisional teacher candidates are drawn from out-of-state colleges; received their undergraduate degrees between 1975 and 1984; and majored in the social sciences, natural sciences, or English. In all, 44 percent had some prior teaching experience and approximately 20 percent had been engaged in full-time teaching careers. Sixty-six percent (671) of the pool went on to complete all application requirements, including the NTE; 117 (12 percent) qualified in more than one field.

The SEA plans to issue a second profile of the provisional teacher pool in the fall of 1986. In June 1986, there were approximately 2,300 qualified candidates available for teaching positions. Not all of these potential teachers had yet taken the NTE.

Selection: Selection of candidates from the eligible applicant pool is an LEA prerogative. Eligible candidates are encouraged to begin a job search on their own. To the extent possible, the state Recruitment and Placement Office acts as a liaison between local districts and the pool of prospective teachers, giving the strongest candidates the most assistance in locating jobs.

Eligible candidates are also invited to maintain a placement file with the Placement Office, including resume, letters of recommendation, and an essay about their views on education. When a candidate accepts an offer from a local district, the LEA notifies the Certification Office which issues a Provisional Teacher Certificate and in turn notifies the state Teacher Education Office to arrange the training program.

By September 1985, 121 alternate route candidates had been hired in New Jersey (including seven by private and parochial schools which contracted with the state to provide the required training and supervision). This number exceeded slightly the program's first year goal of attracting approximately 10 percent of all new teachers through the alternate strategy. In June 1986, the number had risen to 184 due to mid-year hiring.

At least 13 of the 121 teachers employed in September were minorities while 69 were female and 52 male.

The Program

Overview: Provisional teachers attend a program of formal instruction that takes place concurrently with their first year of employment. They also receive extensive on-the-job supervision, support, and evaluation provided by the professional support team organized by the hiring school district.

The training program has three phases:

Phase I: (4 weeks)
- 80 hours of formal instruction (in 1986-87, this initial course-work will take 8 weeks)
- 20 days of observation/initial teaching experience with an experienced, certified teacher in the candidate's field

Phase II: (10 weeks)
- Candidate is assigned to own classroom
- Professional support team formed (must include school principal and a certified teacher; may include two other members)
- Approximately 4 hours of formal instruction per week
- Weekly observation by member of support team
- Formative evaluation at end of tenth week

Phase III: (20 weeks)
- Formal instruction continues at 4 hours per week
- Monthly observation by member of support team
- Formative evaluation, after 20th week of teaching
- Summative evaluation, including recommendation for standard certification, after 30th week of teaching

The Provisional Teacher Program was designed so that Phase I, with its intensive 80 hours of coursework, could be completed either during the summer or during the first month of the academic year. Most candidates in the first cycle chose the latter option. To avoid what proved to be a stressful situation of requiring provisional teachers to be both full-time students and full-time practice teachers during the first month of the program, the 80 hours will be completed in two months in the future.

Formal Instruction: Provisional candidates are required to participate in a total of 200 hours of formal instruction in three basic areas: (1) student learning and development, (2) curriculum and evaluation, and (3) classroom and school. The content of the formal instruction was derived from the recommendations of an ad hoc commission, chaired by Dr. Ernest L. Boyer, President of the Carnegie Foundation for the Advancement of Teaching. The state Office of Teacher Preparation has prepared a handbook giving a curriculum overview and suggesting an instructional timeline for presenting the required content to program participants.

During 1985-86, instruction was provided at seven Regional Training Centers, six of them associated with institutions of higher education, the seventh staffed by independent faculty who had no specific college or university affiliation. In the second year, there will be ten regional centers, each associated with a college or university.

Regional training centers are staffed principally by faculty from colleges and universities, although the SEA strongly encourages use of LEA administrative/supervisory personnel and master teachers in this capacity as well. Participating colleges submit the resumes of proposed faculty and instructional plans for the regional center to the SEA for approval. During the first year of the program, one faculty nominee was rejected.

Field Experience: The Provisional Teacher Program provides on-the-job training. Following four weeks of observation/initial teaching experience with an experienced teacher, the candidate is made fully responsible for a classroom and is paid at least the state-required minimum teacher's salary of $18,500 for a September to June school year.

Supervision: As designed by the SEA, the Provisional Teacher Program incorporates considerable supervision of and support for the teacher candidate. The locus of control for supervision is with the LEA. The four-person support team formed for each provisional teacher must include the school principal, a supervising teacher (who may or may not be the same person with whom the candidate worked during the four week introductory period), and two other members, who may be college faculty involved with the regional centers or other LEA staff.

The model of supervision intended by the program designers is clinical, i.e., "helping the beginning teacher to begin to develop the habit of evaluating and critiquing his/her own behaviors." Candidates are observed once a week during the first 10 weeks and once a month for the remainder of the school year. Theoretically, the members of the support team (particularly the supervising teacher) are also available to provide advice and answer questions on a daily basis. Peer support is encouraged through the sharing of classroom experiences and problems with other provisional teachers in the context of the formal instruction component.

Evaluation of Participants: The SEA developed formative and summative evaluation protocols. The principal of the school in which the candidate is placed must prepare and sign two formative reports and a final summative evaluation with a recommendation on awarding the candidate a standard teaching certificate. Summative reports on first year participants are just beginning to arrive at the SEA.

Faculty at the regional centers were provided with a separate protocol for reporting on the provisional teacher's performance in the formal instruction component. These reports were to be sent to the support team at the LEA. Attendance records were sent to the SEA. The requirements for communication among the separate parts of the training program are becoming more stringent in the second year of operation.

Post-program Placement: The first wave of participants completed the program at the end of the 1985-86 school year. It is expected that some will remain as fully certified teachers in the districts where they interned. Others will change districts. The New Jersey SEA plans to issue a report in fall 1986 that details placement outcomes and updates demographic information on the pool of alternate route candidates.

Program Evaluation: The SEA has engaged in ongoing formative evaluation throughout the first year of operation. Based on this analysis, several program modifications are planned for the second year:

(1) increase the number of regional centers from seven to ten
(2) increase efforts to disseminate information about the program to the LEAs
(3) require stronger linkages between the practical and theoretical components of the program
(4) increase the amount of tuition charged by $200
(5) revise the formal evaluation protocols to provide additional information about the overall performance of the provisional teacher

Financing of the Program and Program Participants

The Provisional Teacher Program is self-supporting and operates on a very small budget. The regional centers where formal instruction occurs are supported by tuition revenues. Instructors at the centers were reimbursed at the State College Overload Compensation Rate of $365 per credit (15 hours = 1 credit). Each center also receives $1,000 for travel. The SEA collects tuition and other costs from participants and disburses it through the state colleges.

Participants were charged $1,150 for training during the first year of the program to cover the following costs:

Tuition for formal instruction	$250
Stipend for mentor teacher (first 4 weeks of program)	400
Stipend for support team teacher	500

Based on a total of 184 participants in the program by the end of the first year, $46,000 was collected for tuition and $165,600 for stipends.

In the second year, tuition will be $450 and the total cost $1,350. Some school districts have partially subsidized participant costs.

The mentor teacher and the support team teacher can be, but are not necessarily, the same person. In some cases, two or more teachers in a school have shared the responsibility and the stipend associated with participation on the support team.

The New Jersey-based Geraldine Dodge Foundation has awarded the SEA a grant of $100,000 per year. Three-quarters of this money is used to support 15 grants of $5,000 each for outstanding alternate route candidates to pursue further study. No separate application is involved. Each candidate who completes the application process is automatically considered for a Dodge Fellowship. Awards are based on the quality of the records submitted: transcripts, resumes, letters of recommendation, and personal essays.

The remaining $25,000 of the Dodge Foundation money supports the work of the Recruitment and Placement Office.

VI. University of New Mexico/ Santa Fe Public Schools Intern Program

The University of New Mexico/Santa Fe Public Schools Intern Program began recruiting in February of 1985, has completed the first cycle, and has begun the second cycle. In the first year, the program served graduates of St. John's College, an institution that maintains campuses in Annapolis, MD and Santa Fe. Interns participate in a 14 month program that combines training at the University of New Mexico and classroom teaching in the Santa Fe Public Schools. Sixteen students entered the program in its first year. Eight were assigned to elementary schools and eight to high schools. One of the unique features of this program is assignment of interns in pairs. Another is the no-cost exchange of services model which enables this program to operate at no additional cost to the school district.

Program Goals and Expectations

The program hopes to attract liberal arts graduates from St. John's College (and, in the second year, other liberal arts colleges) to the teaching profession by providing a specially designed internship program that will lead to full certification as an elementary or secondary school teacher. The Santa Fe school superintendent believes that liberal arts graduates have much to offer education and wants to speed the process of getting them into the classroom.

Recruitment, Application and Selection

Recruitment: In the first year of the program, recruitment was done exclusively among recent graduates of either campus of St. John's College. For the second cycle, the program is recruiting more broadly among graduates of selective liberal arts colleges and universities, including individuals who have been out of college for several years. The minimum qualification is a grade point average of 3.0 for the last 60 undergraduate semester hours.

Application: Eligible applicants must submit: (1) an application form, (2) a professional resume, (3) a transcript, and (4) three letters of reference, and (5) an essay explaining their personal philosophy of teaching/ learning.

For the second cycle that began in the summer of 1986, there were 120 applications for 20 places in the program. About one-third of this new group graduated from one of the St. John's campuses; others schools represented include Brown, Stanford, Dartmouth, Middlebury College, and several state universities.

Selection: Applications are screened by a committee composed of individuals from the University of New Mexico, St. John's College, and the Santa Fe Public Schools. Screening criteria include academic ability, interpersonal skills, the potential for growth and development as a teacher, and the breadth and depth of academic preparation.

Participants selected for the second cycle include an anthropologist, an assistant chemistry teacher from a university, a journalist, a public school social worker, and several people who have worked with children or youths in settings other than public schools.

The Program

Overview: The University of New Mexico/Santa Fe Public Schools Intern Program consists of 14 months of combined coursework and classroom teaching. Students attend summer sessions at the University of New Mexico prior to and following their full academic year teaching internship in the Santa Fe public schools.

Formal Instruction: Formal instruction in methodology is selected which is appropriate for all grade levels and subject areas. Universal teaching strategies which are determined to be appropriate, such as the teaching of skills or concepts or inquiry teaching, are taught in such a way that they are applicable for all areas. The candidate's area of specialization (for future certification) is determined by the examination and analysis of his/her college transcripts.

The 32 hours of education courses required for interns are similar in name to regular education courses offered at the University of New Mexico but are specially tailored for the interns. Areas covered during the first summer session include:

- learning theory
- human growth and development
- effective and affective teaching
- instructional strategies
- provisioning and utilizing the learning environment
- developing a multi-disciplinary approach

Interns are also introduced to working with children in the structured summer school setting.

During the academic year, interns attend weekly evening seminars on curriculum and teaching methodology and monthly Saturday workshops on special topics. In the weekly seminars, professors, support staff, and veteran teachers share instructional strategies with the interns. Workshops are devoted to meeting the immediate inservice needs of interns.

The second summer session consists of coursework in special methodology, such as reading, science, and math for elementary interns. For secondary interns, classes include reading in the content fields and other topics that best meet individual needs.

Field Experience: Participants are required to complete a one-year teaching internship in a Santa Fe public school. Interns assume the full responsibilities of regular classroom teachers.

Two interns are assigned to a classroom. They team teach as well as alternating teaching and observing each other on a regular basis. The pairing

approach allows the opportunity for constant feedback and support and for observing in the classrooms of veteran teachers while the partner is in charge of the classroom.

Supervision: Supervision occurs both at the University of New Mexico and in the Santa Fe schools. The university provides a program coordinator who serves as a liaison among all cooperating parties.

Santa Fe appointed two of its exemplary teachers to serve as full-time clinical support supervisors. These teachers were chosen on the basis of their excellence in the classroom and their interest in future administrative/supervisory roles. One supervises interns in the elementary grades; the other supervises at the secondary level. The supervisors visit one or two of the four classrooms assigned to them daily.

Principals also play an active role in supervision by defining the standards and expectations of each teaching assignment.

Evaluation of Participants: Several types of participant evaluation are used. Independent evaluators review videotapes of intern performance in the classroom, basing their judgments on state-developed teaching competencies.

Principals and support supervisors conduct two evaluations of each intern. Interns also evaluate each other and learn self-evaluation. Comments from veteran teachers, principals, and parents are also solicited.

Post-program Placement: Of the 16 students who entered the first cycle, one left after the first two weeks, realizing early that teaching was not the right career path for him. The remainder have continued and are participating in the final phases. Information about post-program placements for the 1986-87 school year should be available in Fall 1986.

Program Evaluation: The New Mexico SEA conducted an overall program evaluation which determined that:

- the program is a viable alternative that provides a different route to certification without relaxing certification standards
- when compared with veteran teachers, the quality of teaching (as determined by videotaping interns) is at least average and, in most cases, above average in state determined teaching competencies. The interns excelled in content knowledge, creative presentation of materials, and the ability to integrate skill and subject areas.

Financing of the Program and Program Participants

The State Department of Education provided $22,300 in Title II support for the university courses required for interns to meet state certification standards. Interns were not charged tuition.

The Santa Fe Public Schools contributed the estimated amount that it would cost to staff eight classrooms (salaries and fringe benefits). Half

this amount is used to pay the salaries of the clinical supervisors and program coordinators and to provide other support services. The remainder provides university fellowships of $7,000 to the interns.

The program's total budget for the first year was $208,000. Of that amount, $112,000 was dispensed for student stipends. Approximately $86,000 was used for salaries and fringe benefits for the clinical supervisors and the program coordinator to provide instruction, supervision, and administrative services. The remainder provided consultant services, travel funds, and supplies. As mentioned earlier, however, the total budget is the figure which would have been required to staff eight classrooms in the traditional manner, so no increased expenditure was required by the public schools.

VII. University of Southern Maine Teachers for Secondary Schools Program

The Teachers for Secondary Schools Program sponsored by the University of Southern Maine is an alternative certification program designed for midcareer people with a bachelor's degree in the arts and sciences or in engineering. Three cycles of participants have completed the program. Each cycle has accommodated 15-16 people. The majority have been preparing for careers as secondary school science teachers.

Goals and Expectations

The Teachers for Secondary Schools Program is not a response to a teacher shortage problem in terms of total numbers but rather to concerns about teacher quality. Designers of the program believed that there was a pool of people harboring a desire to teach who had made some other career choice five or ten years previously, perhaps because teaching was not an acceptable aspiration at the selective undergraduate institutions they attended. The goal of the program, therefore, was to attract such people and offer them a challenging and rigorous way to enter the profession that they had initially rejected. Program completers would receive standard certification allowing them to teach in Maine high schools.

Recruitment, Application, and Selection

Recruitment: For a time, newspaper advertising was used to generate applicants. The program now relies on word-of-mouth publicity. Forty to sixty applications have been received for each cycle. Newspaper articles about the program, such as a recent one in the New York Times, also result in inquiries from potential applicants.

Application process: Applicants must submit a transcript and an essay. A full day of interviews is considered a critical part of the application process.

Selection: Applications are carefully screened by a committee of university personnel and representatives of the local school districts where program participants will have their student teaching experiences. In the interviews and the documentation submitted by applicants, the committee looks for superior academic performance, a record of involvement with adolescents, and a number of personal qualities: sincere motivation, risk taking, creativity, and work and travel experience, for example.

The Program

The Teachers for Secondary Schools Program is a two semester post-baccalaureate program. Completion of the program leads to automatic certification in the state of Maine and leaves participants only 9-12 hours short of a master's degree.

Formal Instruction: The first semester of the program is primarily university-based and intensely academic, although related observation in classrooms is also required. The curriculum revolves around three main areas of study:

- Analysis of Teaching
- Understanding the Learner
- Organizational Behavior and Change

Videotapes, preparation and presentation of lessons to other participants, and observation in schools supplement lectures and discussion, gradually acclimating the students to situations they will encounter in the field-based second semester.

The "Understanding the Learner" component focuses on the human life cycle with a particular emphasis on adolescents and learning theory. "Organizational Behavior and Change" as an area of study is designed both to familiarize the potential teachers with the norms of schools as organizations and to stimulate ideas about ways of modifying some of those norms to create a better atmosphere for teaching and learning.

Field Experience: During the spring semester, program participants are placed in an intensive internship in one of six cooperating school districts in the metropolitan Portland area. Working closely with a supervising teacher, the interns gradually assume full classroom responsibility.

Participants attend bi-weekly seminars during the field experience to share experiences and explore solutions to problems that arise as well as extend their methodological and theoretical background for teaching.

Supervision: In addition to the supervising teacher assigned by the school district, participants also have university supervision. During the first two cycles, several university faculty shared this responsibility, but it was felt that this type of supervision (typical of field experience programs for regular undergraduate education majors) was too fragmented. In the third cycle, the university assigned a single person to supervise program participants in the field and coordinate the program. This is considered more effective.

The model of supervision used is described as a coaching approach, synthesized from several frequently cited models.

In addition to the support provided by a cooperating teacher and university supervisor, this program relies heavily on peer support. The program begins with a four day Outward Bound type of experience, designed to foster a group feeling and sense of mutual responsibility. This has worked well. Participants, many of whom have families, have assisted each other in a multitude of ways, including formation of day care groups and organization of pot-luck suppers at the end of the month when finances might get tight. Students from the first cycle still meet occasionally as an ongoing support group.

Evaluation of Participants: The Teachers for Secondary Schools Program is proficiency-based. Students must meet daily objectives and requirements before passing on to new material.

The State Board of Education was favorably impressed with the outline of the program when it was presented as a pilot project and agreed to give automatic certification to all who completed the year. This agreement still applies.

Maine is in the process of phasing in a requirement that all new teachers pass the National Teacher Examination. Currently, the state is validating the cut-off score that will govern entrance into the profession. Program participants, like recent graduates of state undergraduate teacher education programs, must take the NTE as part of the validation process.

Post-program Placement: All program completers who have persisted in seeking teaching positions have been placed. Some have opted for nonclassroom careers that are related to the training they received such as community education or museum education work. A few have already left the profession.

One person closely associated with the program reflected that the supportiveness of the program may ill prepare some individuals for the realities of the first year teacher's lot. One student--described as the outstanding member of her cycle--took a position as a science teacher and was assigned five different classroom preparations, a study hall, and no preparation period. She left teaching after six weeks.

Program Evaluation: The designers of the program have engaged in ongoing formative evaluation, resulting in changes such as the hiring of a university-based supervisor who can give full-time attention to the program and the linking of the academic component to the regular master's degree program.

An SEA evaluation of the program at the end of the first cycle was favorable.

Maine is taking seriously the issue of induction of new teachers. It has mandated a sequential certification process, including the idea of supported teaching in the early years. So far, however, only 20 pilot school districts are using this model for supervision and support of novice teachers.

Financing of Program and Program Participants

Program participants in the Teachers for Secondary Schools Program bear the full cost of tuition and related expenses. The university assists them in obtaining student financial aid, low interest bank loans, and forgiveable loans. The state has established the Blaine House Scholarship Program to support prospective teachers who are graduates of Maine high schools. Five participants took advantage of this opportunity last year, but most are transplants to the state and are thus ineligible.

The Lyndhurst Fellows Program in Tennessee [see Appendix C] is a variation of the program at the University of Southern Maine. Students in the Lyndhurst Program receive substantial stipends. However, it has also supported more candidates who ultimately do not choose to teach. The Maine program coordinators would prefer to subsidize students, but believe the absence of stipends may intensify the commitment of participants.

The program's estimated total annual budget in 1985-86 was $49,400. Its only source of funding is tuition revenues. Approximately $25,000 is allocated to instruction. Supervising teachers receiving $250 dollars each, plus a voucher for one university course worth about $175. Other costs include a portion of the director's salary, two social events, printing costs, and the four day Outward Bound program.

RETRAINING PROGRAMS

I. Delaware Retraining Programs

In 1984, the Delaware state legislature authorized five programs for the recruiting and training of professional educators in designated critical curricular areas. Three of these programs are for teacher retraining: the Summer Institute, the Academic Year Institute, and the Teacher Scholarship Loan Program. For the 1985-86 and 1986-87 years, the identified critical curricular areas are chemistry, physics, physical science, computer science, and mathematics in grades 7-12. Participants in the programs enroll in college level math, science, or computer courses that will enable them to meet Delaware certification requirements. The Summer and Academic Year Institutes are located at the University of Delaware and/or Delaware State College. Participants in the Scholarship Loan Program must be Delaware residents and must have taught in Delaware for at least one year but may take their training in an approved program at any institution of higher education. An individual may participate in more than one program.

Program Goals and Expectations

The mutual goal of these three programs is to retrain teachers for critical shortage areas. Identification of shortage areas is based on supply and demand information from local school districts and on state or national projections. The pools of possible participants targeted are current teachers and inactive but certified teachers living in the state. Minorities and women are particularly encouraged to apply.

Delaware does not currently have large teacher shortages, even in the identified critical curricular areas. However, the SEA projects an increasing supply and demand problem in the next three years. The programs, therefore, are in part designed to be preventative.

Recruitment, Application, and Selection

Recruitment: The SEA has publicized the retraining programs by direct mail to LEAs, in newspapers, and by word of mouth.

Application: Each program requires a separate application, although the application process is essentially the same. In addition to a basic state-developed application form, a candidate must submit a letter of intent or essay, a plan outlining educational plans (including a timeline), and a letter of recommendation from the superintendent or other appropriate supervisor.

Selection: The official descriptions of the retraining programs indicate that selection is competitive. An application review panel made up of SEA staff examines the applications and selects participants. Selection criteria include undergraduate grade point average, previous background in math and

science, strength of the supervisory recommendation, and the commitment to teaching in critical curricular areas expressed in the applicant's letter or essay.

The Teacher Scholarship Loan Program involves considerably more SEA financial investment in an individual than the Academic Year and Summer Institutes and is therefore somewhat more selective. In the first year of the Scholarship Loan Program, there were 18 applicants; eight were selected. Six have been selected for the second year which began this summer.

In practice, the Academic Year and Summer Institutes have attempted to accommodate all applicants who completed the application process. The Summer Institute is the most popular. Last year (summer 1985), about 100 retrainees enrolled in the math, science, and computer programs. The math area attracts the most applicants.

The Programs

Overview: The Academic Year and Summer Institutes are based on campuses of the Delaware public higher education system. Participants take math, science, or computer courses to meet state certification requirements in those areas. The total number of courses that an individual must take depends on previous educational background. Most participants, however, have few carryover credits.

The Teacher Scholarship Loan Program supports an academic year of full-time study for selected retrainees. Participants in this program may also participate in the Institutes either prior to or following the sabbatical year in order to complete all courses for certification.

Formal Instruction: The courses to be taken vary according to the certification that a participant is seeking. For math, no structured program is suggested by the state. To teach math in grades 9-12, 30 hours of mathematics are required. Junior high math teachers must have 21 hours to teach academic classes and 15 hours for nonacademic. Within the sciences, requirements for the physics, chemistry, and physical sciences credentials are different. Course and semester-hour requirements for chemistry and physics appear below:

Chemistry	
Chemistry (5 areas specified)	24 hours
Biology	3 hours
Physics	3 hours
Math	6 hours
Earth Sciences	3 hours
Environmental Ed.	3 hours
	42 hours

Physics	
Physics (3 areas specified)	24 hours
Biology	3 hours
Chemistry	3 hours
Mathematics	9 hours
Earth Sciences	3 hours
Environmental Ed.	3 hours
	45 hours

Typically, an applicant to the retraining programs presents between three and nine acceptable math and/or science credits from the undergraduate degree.

Most participants begin their retraining in the Summer Institute. In order to keep the program identifiable, the SEA requested that the participating institutions of higher education form special sections of regular math and science classes for the retrainees. In some instances, this has resulted in a very low instructor-to-student ratio.

The Summer Institute is an intensive six week session. Participants register for a minimum of six semester hours (two courses). During the first summer, a total of 100 retrainees enrolled but the attrition rate was high. At the end of the session, only two or three participants remained in the sciences, seven in computers, and 29 (about 50 percent of the entering number) in math. In summer 1986, the Institute provided three math offerings: advanced geometry, insights to math, and a methods course. Nineteen retrainees were enrolled initially in the geometry course; after four weeks, six remained. Insights to math ("a liberal arts-oriented course for non-math majors") and the methods course each attracted about 20 registrants.

Organizing a curriculum for science retrainees is somewhat more complicated and requires the cooperation of several departments in the institutions of higher education. Over a two year period (summer and academic year programs), participants have been offered introductory courses in physics, chemistry, and biology, two geology courses, a higher level physics course, and astronomy. Enrollment in the sciences is low. One instructor who has been closely associated with the retraining programs estimated that most retrainee sections of courses cover only about one-half to two-thirds of the material presented in a typical undergraduate course.

By applying to the Academic Year Institute, retrainees may take one course each semester during the school year. In math, no special sections are provided; participants enroll directly in courses listed in the catalogue. Science retrainees have had special sections offered to them during the academic year; typically, these have been classes of five or six people, which the university has allowed only because the SEA has paid for instructional time.

Participants in the Teacher Scholarship Loan Program are on sabbatical and take a full academic load during fall and spring semesters. If special sections of retrainees have been formed, Scholarship Loan recipients may enroll in these. Otherwise, they take courses available from the catalogue.

Field Experience: There are no field experiences associated with the Delaware retraining programs.

Supervision: No supervision or other formal support systems are provided by the retraining program. Particularly in the sciences, small class sizes have allowed a great deal of individualized attention. The SEA math and science supervisors have made themselves available to participants for help with course planning and identifying good instructors at the institutions of higher education.

Evaluation of Participants: In order to be reimbursed (see financing section below), Institute participants must earn at least a "C" in a course. No academic performance requirements are attached to the Scholarship Loan Program. Since this program is more selective, it may be assumed that participants will maintain a respectable grade point average.

After two years of experience with the retraining effort, involved staff at the University of Delaware report disappointment with the results. The attrition rate has been high and course standards have been lowered in order to allow participants to achieve the grade necessary for reimbursement. A science instructor reported that of the approximately 12 retrainees he has worked with, he expects one to eventually qualify for certification.

From the SEA's perspective, at least part of the problem lies with the attitude of university professors, particularly that of mathematicians (perceived to be an exclusive group) toward non-math majors. In fact, difficulty in completing a mathematics program is not limited to teacher retrainees. One professor acknowledged that for every 40 undergraduates who declare a math major in the sophomore year, four to six actually complete the major.

Post-program Placement: Few participants in the Delaware retraining programs have yet completed all requirements for recertification. The SEA reports that seven or eight participants will finish soon.

Completers are expected to teach math or science in their home districts or in other Delaware school systems as positions become available. Two participants interviewed for this study are completing their requirements in the current Summer Institute. Both began in the 1984-85 Academic Year Institute, followed by a Summer Institute, and finally, full-time study during the 1985-56 school year under the Scholarship Loan Program. One will teach ninth grade math and Algebra I in 1986-87. The other, originally certified in earth science, will continue in this field until a chemistry teaching assignment opens.

The SEA is in the process of establishing tracking and evaluation systems for participants.

Program Evaluation: The SEA has engaged in some formative evaluation as the programs have developed. Based on the difficulties some participants encountered in the sequence of the math program, the course rotation was changed. The SEA has requested more money for 1986-87 in order to continue its commitment to those who have already begun and also bring new participants into the programs.

Financing of the Program and Program Participants

Delaware has a total of five state-supported programs to prepare math and science teachers for its schools. An undergraduate loan program and a program to draw in early retirees from business and industry have not been described here. The latter has not worked well and is currently being revised. The five programs receive a single allocation in the state budget. In 1985-86, that amount was $525,000. The Instructional Services Branch of the Department

of Public Instruction recommends suballocations among the programs to the State Board of Education. Last year, the Teacher Scholarship Loan Program received $100,000, the Summer Institute received $199,000, and the Academic Year Institute was allocated $98,500. SEA administrative costs are budgeted at $28,000.

Participants in all three retraining programs receive some type of state financial support. The Summer Institute provides full support for tuition, textbooks, and laboratory fees as well as a stipend of $250 per week up to a maximum of $1,500 for a six week session. Payment of the stipend is dependent on successful completion of the courses with a grade of "C" or better. The Academic Year Institute pays for tuition, textbooks, laboratory fees, and mileage costs. For both Institutes, the State Board of Education either makes direct payment to the institution of higher education or reimburses the participant upon receipt of proper documentation of expenses.

Participants in the Teacher Scholarship Loan Program receive a scholarship equal to the salary they would receive for 185 days of service as a teacher. All state-supported employee benefits are also maintained during the leave of absence. LEAs have the option of providing a salary supplement and local benefits. A participant is also eligible for an interest-free loan of up to $5,000 to cover tuition and books. One-third of the loan will be forgiven for each of three years of subsequent teaching in Delaware public schools.

II. Long Island University Mathematics Retraining Program

The Hellman Academy for Mathematics and Science Teacher Retraining

The Long Island University (LIU) Mathematics Retraining Program has been in operation since 1977. It was first implemented in response to a 1976 New York City Board of Education decision to lay off thousands of teachers in the humanities, social studies, and elementary education at the same time that the school system was experiencing shortages of instructors in math and physical science. A New York state recertification law, allowing for the retraining of teachers, had already been enacted. Long Island University responded by designing a program "fine tuned" for the needs of experienced teachers and adult learners.

The LIU program received its initial funding from the National Science Foundation (NSF) and is currently being supported by the Fund for the Improvement of Post-secondary Education (FIPSE). In 1985-86, 32 students were admitted, 25 of whom completed the program. This was an intentional drop from the approximately 50 students who had been admitted annually in previous years. Fifty was considered too large for one section.

The Long Island University Mathematics Retraining Program has been disseminated to seven other universities including Trenton State College (NJ), Beaver College (PA), the University of Miami, Arizona State University, Texas Women's University, and Western Oregon State College.

A program to retrain teachers in physics has also been developed and is being offered at the University of Northern Colorado. It was offered at LIU in 1984-85.

Program Goals and Expectations

Beyond addressing New York City's shortage of qualified math and science teachers, a major goal of the LIU program has been to develop a structural innovation in math/science teacher training. The courses have been designed with the needs of experienced teachers in mind and are not simply a repackaging of the undergraduate curriculum. The program also uses a building block (mastery learning) approach. Students cannot begin a new topic without completing and passing the previous one.

Another goal of the program is to encourage teachers who are bored or burned out in their current teaching assignments to remain in the profession. In fact, several participants who were interviewed cited this as their motivation for entering the program.

Recruitment, Application, and Selection

Recruitment: Recruitment practices at Long Island University are closely coordinated with those of the New York City Board of Education. Advertisements have appeared in the New York Times, union magazines, and flyers sent to schools. A recent Cable News Network feature on the program also assisted in recruitment as does word-of-mouth publicity.

Although the Long Island University Mathematics Retraining Program recruits from among all qualified applicants, its particular target groups include women, minorities, and teachers with emergency certification.

Application: A teacher is considered eligible to apply for admittance to LIU if he or she has teaching experience, one year of college math or physics, and two letters of recommendation.

The application process requires that an individual complete a specially designed application form and participate in a set of interviews. The interviews are considered a critical component of the process. A committee makes the final admissions decisions. Applicants are placed in four categories: (1) admitted without condition, (2) admitted on a conditional basis, (3) wait listed, or (4) rejected.

Selection: The number of applications has decreased over time. Originally there were 250 applicants for 50 spaces. The ratio is now 3 to 1. The program director feels that this continues to be an impressive ratio considering the fact that the City University of New York offers many free programs.

Among the participants during 1985-86, the age range was 23 to 61. Of 12 students in that group responding to a program evaluation survey, three were elementary education majors, four majored in social science, and three concentrated in science. One respondent was a math major. All 12 students had studied beyond the master's level. Years of teaching experience ranged from one to nineteen with a mean of nine. Six students were currently teaching junior high, three elementary school, and three at the high school level.

Many program participants are already teaching math as out-of-field instructors while they are completing the program.

The Program

Formal Instruction: Formal instruction in the Long Island University Mathematics Retraining Program is designed to provide coursework in mathematics that will allow participants to pass the New York City examination for teachers of secondary level math. No education-related or human development courses are included in the curriculum.

Participants must complete 15-18 credit hours of math. Subject area courses include:

- A refresher course in math (optional credits)
- Survey of Mathematics
- Applied Calculus I and II
- Introduction to Modern Mathematics
- Selected Topics in Mathematics.

The refresher course is offered in the summer. During the school year, trainees attend four hours of lecture weekly. An additional two to three hours are spent in a workshop where students do problem solving, check homework, and work out points of confusion. Credit is earned for lecture hours only.

Field Experience: The Long Island University Mathematics Retraining Program includes no field experience. All participants are experienced teachers.

Supervision: After placement as certified math teachers, the department chairperson in each school supervises the retrained teachers. Some follow-up has been undertaken to determine whether there are any discernible differences between regular and retrained teachers.

Evaluation of Participants: Program participants are pre- and post-tested to collect information on their attitudes and their self-concept of their ability in math. Pre- and post-tests are also conducted on content. Among the 16 retrainees who completed the program in 1984-85, the range of correct answers on a 30-item pre-test was from 4 to 18. On the post-test, the range was 21 to 27, indicating that considerable progress had been made, particularly with those students who had the farthest to go.

In order to teach math in the New York City schools, participants must pass a city mathematics examination. LIU helps program participants prepare for this test.

Post-program Placement: All program graduates are working, but not necessarily as math teachers. Many pursue a master's degree after completing the LIU sequence. Fifty percent of the 1984-85 class indicated their intention to pursue their studies.

Program Evaluation: Under its FIPSE grant, the program has hired an independent evaluator. Information cited above concerning the 1984-85 participants is drawn from the evaluator's report.

Of the 12 students who responded to the evaluator's questionnaire requesting them to rate the program and services provided, most reported themselves as satisfied with their experience. Counseling and the parking and dining arrangements received somewhat lower ratings than other areas. On a grading scale of A to F, the vast majority of respondents gave every course an A or B.

Financing of the Program and Program Participants

Participants are partially responsible for their tuition at Long Island University. The cost is $100/semester hour or between $1,500 and $1,800

total. Last year, a Title II grant was used to provide stipends of $1,000, a book allowance, and student aid.

In 1985-86, the program was supported by a $145,000 grant from FIPSE and a $25,000 Title II grant in addition to tuition revenues. A large portion of the FIPSE grant is allocated to dissemination of the LIU model to other sites.

III. Los Angeles County Mathematics Teacher Retraining Program

The Los Angeles County Teacher Retraining Program was established in 1982-83 in response to a shortage of qualified math teachers, particularly at the junior high school level. Participants who complete the program receive a "Supplementary Authorization" to the credential they already hold that allows them to teach mathematics courses up to the 9th grade level. The third cycle of participants began this summer.

The program is administratively complex, requiring cooperation among the SEA, the county, institutions of higher education, and multiple LEAs. The program is funded by the state. Although the county administers the program, the Staff Development Unit at the California State Department of Education is responsible for approving the use of the funds. Institutions of higher education provide the retraining instruction for the county. Forty-seven out of 80 school districts in Los Angeles County have teachers participating in the program.

Program Goals and Expectations

The Los Angeles County Mathematics Teacher Retraining Program was developed to address math teacher shortages documented by local school districts. The need for math teachers in Los Angeles County is considered to be extensive. The county administrator of the program reported that the retraining program has provided a large number of well-qualified math teachers to help fill this void.

One intention of the program is to develop and maintain coordination and cooperative planning among many institutional components. The program requires cooperation among the SEA, the county, many LEAs, and, at present, four institutions of higher education: Whittier College, the University of La Verne, El Camino College, and Glendale College. Whittier, La Verne, and El Camino run math retraining programs; Glendale is the single site for science retraining. Negotiations are currently under way to open a science site at California State University at Long Beach.

The county provides overall coordination and administration. The administrative office issues an RFP, requesting proposals for credentialing coursework, to local universities. Responses are read and selected on the basis of quality and cost-effectiveness.

Local districts participate in the teacher retraining program in a variety of ways. Some districts are more active and provide considerably more professional support than others. Each site has a Site Planning Team composed of representatives from districts, program participants, county program administrators, and the IHE coordinator and instructors. Whittier College reports that this strategy for involving all interested parties has worked well. The University of La Verne has had less success with cooperative planning. This is an area of program operation that the county has targeted as needing improvement.

Recruitment, Application, and Selection

This section and the program description that follows are based on interviews with the county program administrator and with administrators, instructors, and participants at Whittier College and the University of La Verne, two of the four sites in operation during Cycle II.

Recruitment: Every participating LEA selects and nominates participants. In 1984-85, after initial district screening procedures, about 100 recruits applied for admission. The county accepts applications from teachers currently teaching in any subject area. However, it particularly encourages the LEAs to nominate those with emergency credentials or certification in non-shortage areas.

Program recruitment primarily occurs through meetings between county program staff and district liaisons. The program has also received some publicity through newspaper articles. Many applicants learn of it by word of mouth.

Application and Selection: Applications are first submitted to the local school principal. Once an applicant is approved by a school district, his or her credentials and transcripts are submitted to the county for review by a small committee of staff people, including a credential analyst.

Acceptance to the program is conditional until completion of the introductory review course at the beginning of each cycle. Participants accepted into the program attend the site most convenient for them. Whittier's program is campus-based. The University of La Verne uses off-campus sites, one in the San Fernando Valley and one in Long Beach.

Whittier College has just begun its third cycle with 31 participants. The first cycle started with 60 students; 39 (65 percent) completed the program. In the second cycle, 21 enrolled and 14 (67 percent) finished. The University of La Verne had 35 in its initial group last year. Of these, 10 have completed and 14 will finish in January, yielding an estimated completion rate of 69 percent. Eleven participants have dropped out. There are 40 participants enrolled for La Verne's second cycle.

The Program

Overview: Implementation of the instructional component of this program is the responsibility of four institutions of higher education in the greater Los Angeles area. L.A. County staff work with the IHEs to help them interpret the instructional model, which includes the integration of content and methodology, and the modeling of appropriate teaching strategies. More IHEs will be involved next year. While there are many similarities among the sites, there are also some differences. The programs at the University of La Verne and Whittier College were examined for this report.

Formal Instruction: The courses offered in the program meet the California credential requirements and include: real number systems, introduction to math, college algebra, geometry, pre-calculus, trigonometry, and calculus. Based on transcript evaluation, participants may be required to

take all or some of these courses at the rate of one course per semester while working full-time at their teaching jobs. Only math courses taken within the past seven years are credited; no credit is allowed for remedial courses. These criteria are more stringent than the state-established minimum requirements for credentials, under which any previous coursework in math would be acceptable.

Both the University of La Verne and Whittier have included a computer course in the programs they offer. Use of computers as an instructional tool will be integrated into all courses for the cycle of participants starting the program in summer 1986. Both institutions have also added a review course in algebra to the curriculum. La Verne did so in response to student requests during its first cycle. Participants in that cycle were given the option of taking the review or proceeding directly through the program sequence. About two-thirds opted for the refresher course. In its first cycle, Whittier tailored its program to the individual needs of participants by dividing the rather large group of sixty students into two tracks based on previous mathematical background.

Whittier College staffs its teacher retraining program entirely with college faculty. Of the five mathematics department professors, three teach in the program. The University of Laverne uses a combination of its own faculty and part-time staff who are also high school math teachers.

Individualized tutoring is made available to participants one evening per week at the program site. Whittier has principally used undergraduate math majors as tutors. The University of La Verne uses certified high school math teachers. In Cycle II, approximately two-thirds of participants took advantage of the tutoring. Overall, participants seem to feel that the program offers sufficient individual support.

Field Experience: There is no field component in this program in the sense of a supervised internship. Participants continue to teach in their regularly assigned classrooms during retraining. An evaluation report on Cycle II of the program found that 27 percent of program completers had previously taught math or science as out-of-field teachers when they first entered the program. During the program, approximately 60 percent of the participants gradually moved into math or science classrooms.

The program does include county-sponsored workshops during the week and on Saturdays. Participants are required to attend one workshop per semester, and some attend several. The workshops are run by experienced math teachers and trainers and feature "hands-on" experiences and tips on how to teach math successfully.

Supervision: Supervision of the new math teachers, once they have completed the program, is an LEA function. In some cases a mentor teacher or principal is assigned to help the teacher. The Los Angeles Unified School District has a "buddy system" whereby a teacher new to teaching a subject is assigned an experienced partner.

During Cycle II of the program, nineteen participants responding to an evaluation survey reported receiving support from their building principals and/or mathematics teachers in their schools or districts. An unspecified number felt they had not been supported at the local level.

Evaluation of Participants: Participants must complete the program with a "C" average or better in order to qualify for the Supplementary Authorization to their teaching credential. The SEA does not require an institutional recommendation from either the IHE or the county. However, IHEs do recommend participants to the Commission on Teacher Licensing when they successfully complete the program. The University of La Verne assists participants with the paperwork involved in obtaining the Supplementary Authorization.

Participants who are interested in obtaining a credential to teach higher level mathematics courses at the secondary level have two options. They can go on with their coursework and obtain a master's degree or they can take the National Teacher Examination. A few program completers have indicated their intention to pursue one or the other of these routes.

The program has a fairly significant attrition rate. Based on the estimates provided by two IHEs, approximately one-third of the students at each site drop out. IHE program administrators report that most students leave because of personal problems involving scheduling or the amount of time involved. According to a program evaluation, however, half of 38 program leavers responding to an evaluation questionnaire cited difficulty with content as the reason for dropping out.

Post-program Placement: The program administration has tracked the placement of program completers in math classrooms for previous cycles and is in the process of following through on participants who recently completed the program.

Program Evaluation: An independent evaluator has prepared a summative evaluation of Cycle II of the Mathematics and Science Teacher Retraining Program. Seventy-one percent of the participants completed the program. Participants who had 14 or more years of teaching experience, had previously taught math or science, scored above the 70th percentile on a math screening test, and took seven or more credits of undergraduate math and science were more likely to be successful in the program. Most differences noted, however, were not statistically significant.

Program completers were asked to respond to questions about how prepared they were when they entered the program and at the end of the program to teach basic mathematics, introductory algebra, geometry, advanced algebra, calculus, problem solving, and using computers for instruction. The following table indicates the proportion of participants responding "well prepared" for each teaching assignment at entry and exit:

	At Entry	At Exit	Increase
Basic mathematics	73%	93%	20
Introductory algebra	36%	89%	53
Geometry	9%	48%	39
Problem solving	12	44%	32
Advanced algebra	0%	22%	22
Computers for instruction	12%	26%	14
Calculus	0%	14%	14

Since the goal of the program is to prepare participants for a Supplementary Credential allowing them to teach grades seven to nine, the outcomes indicated above are entirely appropriate.

Financing of the Program and Program Participants

The state provides funding for the teacher retraining program with the county as the administrative agent. Tuition, fees and books are covered for each participant. Seventy-eight percent of Cycle II participants indicated that this feature was very important to their completion of the program. The only cost to students is transportation.

The program has received $500,000 from the state for each cycle. Of this amount, 50-70 percent goes to the participating IHEs. Administrative costs are about 10 percent. Other costs include trainers, the Saturday training modules, program orientations, materials, and external evaluation. A full budget breakdown was not available.

APPENDIX C

OVERVIEWS OF SUPPLEMENTARY SAMPLE OF ALTERNATIVE CERTIFICATION AND RETRAINING PROGRAMS

I. ALTERNATIVE CERTIFICATION PROGRAMS

1. Math/English/Science/Technology Education Project University of Massachusetts at Amherst

The Math/English/Science/Technology Education Project (M/E/S/TEP) is operated by the University of Massachusetts at Amherst in cooperation with LEAs, the Bay State Skills Corporation, and Digital Equipment Corporation. It is the prototype for the Arizona Partners Project, described in depth in Appendix A. The project, launched in 1983, is designed to counter the effects of the high technology boom in Massachusetts on the availability of good teachers. It offers alternative certification through a 15-month work/study program. The program includes a semester internship in a school, a semester internship in a corporation, education-related coursework, and career development support.

Admission is highly selective. The program admits approximately twenty participants per year. At completion of M/E/S/TEP, a student earns a master's degree in education, is fully certified to teach in Massachusetts, and is offered a summer internship in the corporation for which he or she worked. Every graduate is required to remain in the teaching profession for three years after graduation.

2. The Lyndhurst Program at Memphis State University

The Lyndhurst Program at Memphis State University is an alternative certification program just beginning its second year of operation. It is supported by a grant from the Lyndhurst Foundation. The program is designed to attract academically talented students with liberal arts backgrounds in teacher shortage areas (e.g., math, science, foreign languages, English, art, and music) into the classroom. The program is modeled after the University of Southern Maine's "Teachers for Secondary Schools Program," described in Appendix A.

Prior to admission into the program, participants must be sponsored by an LEA which recruits participants based on local areas of shortage. Participants in the first year ranged in age from 21 to 57 and included retired military personnel, nurses and recent college graduates. Participants are selected by a screening committee composed of representatives from the Colleges of Education and Liberal Arts at Memphis State, the SEA, and the sponsoring LEA. Final admissions decisions are based on an interview and assessment of writing skills.

Trainees serve an internship in the LEA during the fall, while taking classes one night per week in education-related topics at Memphis State University. Their internship includes both classroom teaching and observation.

Participants currently receive $10,000 to cover tuition and living expenses. The Lyndhurst Foundation grant covers $3,000 per person, and the LEA provides $7,000 for the student's internship. Three LEAs participated during the program's first year and sponsored 12 participants. Six LEAs will participate this year, sponsoring 23 trainees.

3. George Mason University (VA)
"Career Switcher"
Alternative Certification Program

In response to the shortage of qualified science teachers in Northern Virginia, George Mason University has recently implemented an alternative certification program designed to attract individuals with degrees in either physics, chemistry, or earth science to the teaching profession. The program will admit only 12 students. In addition to an appropriate undergraduate degree, applicants also must have at least a 2.75 GPA, pass a computer literacy examination, participate in a faculty-conducted interview, and pass the National Teacher Examination (as required by the state of Virginia).

The Career Switcher Program focuses on the teaching of physics, chemistry, and earth science at the secondary level. It is designed to conform to the latest research in teacher and adult education and the standards established by the National Science Teachers Association and the Virginia Beginning Teachers Assistance Program.

The one semester program requires a minimum of 120 hours of direct teaching in a cooperating school district. Formal coursework includes essential elements of secondary education, the psychological foundations of adolescent learning and development, and secondary science methods. All courses are held in Arlington County, Virginia public schools.

4. The Teacher Intern Program
Commonwealth of Pennsylvania

The Pennsylvania Teacher Intern Program is an alternative certification program designed for degreed individuals who are interested in teaching but lack the required certification credentials. It has existed since 1972 and operates in cooperation with colleges and universities that have teacher intern programs.

To enter the program, an individual must hold a bachelor's degree, meet the requirements for admission to a college or university's graduate school, and obtain a teaching position. When these criteria have been met, the state issues an Intern Certificate, which is valid for three years of teaching. During this time, an intern must remain enrolled in the sponsoring IHE. An intern receives the salary normally paid to a beginning certified teacher. Level I Certification is granted once the intern program is completed.

Participating IHEs include Beaver College, Duquesne University, Lehigh University, Temple University, the University of Pennsylvania, and the University of Pittsburgh.

5. University of Maryland
Alternative Certification Program

The Alternative Certification Program at the University of Maryland originated as a result of a Maryland Department of Education initiative to develop alternative standards for people wanting to teach. Although the program is sponsored by the University of Maryland, it is closely coordinated with the SEA. Eight participants will complete the program at the end of this summer with a master's degree in education and automatic certification.

Twenty-six students have recently begun the program's second cycle. Participants are mainly mid-career level. Admissions requirements include a bachelor's degree with a minimum 3.0 GPA, fulfillment of the requirements for entry into the University of Maryland Graduate School of Education, a successful interview, and a writing sample.

Completion of the program requires two summers and an academic year. Participants complete 43-49 credits in integrated course offerings that focus on most areas of curriculum and instruction, including early childhood, elementary, and secondary education. New courses were created specifically for the program. Three credits of classroom observation are required in the fall, followed by a supervised apprenticeship in the spring.

A small state grant was provided for the program in its first year. Participants are, however, required to pay their own tuition.

RETRAINING PROGRAMS

6. Mathematics/Science Relicensing Program
New York City Board of Education

The New York City Board of Education sponsors a Mathematics/Science Relicensing program designed to expand the pool of licensed science and mathematics teachers. The program, which has existed since 1982, operates in conjunction with metropolitan area IHEs. A published schedule provides course descriptions at each institution.

Courses, which are approved by the New York City Board of Education's Directors of Math or Science, are offered at the undergraduate level, and participants earn either three or four credits per course. Eighteen mathematics credits are required for recertification at the junior high school level; 24 credits are required for senior high school mathematics recertification; and 36 credits are required for recertification in the sciences. Courses are self-contained and offered after regular teaching hours. Tuition, books and laboratory fees are provided by the New York City Board of Education.

Participating IHEs are also required to provide career counseling and tutorial assistance to all students.

Prospective participants must submit a standard application form, signed by their principal, to the Division of Curriculum and Instruction at the New York City Board of Education.

7. Anne Arundel County (MD) Public School System Retraining Program in Science

In response to a shortage of qualified science teachers at both the elementary and secondary levels, the Anne Arundel County Public School System implemented a county-sponsored program designed both to retrain teachers in science and to upgrade the certification of teachers already certified in science. The program began in the spring of 1984 and will complete its first cycle in the spring of 1987.

The University of Maryland provides the coursework for the program. The IHE and LEA worked cooperatively to design the requirements for both the recertification and upgrading programs. The retraining program offers 30 credits in the biological and physical sciences. The upgrading program offers four courses in chemistry and four in physics; additional courses are optional. Courses to update teachers in biology and earth sciences have been available as well. All courses are offered at the graduate level. However, they do not count toward a master's degree in science. A participant's academic program is designed through individual counseling.

All county teachers are eligible to participate in the retraining program, and those with previous certification in the sciences are eligible for the upgrading program. Tuition and laboratory costs are provided by the Anne Arundel County Public School System, on the condition that the participant maintain a B average in the program. Teachers must also agree to teach in the county for the year following program completion or reimburse the county for tuition costs.

8. Winston-Salem/Forsyth County (NC) Consortium for Personnel Development

The Winston-Salem/Forsyth County Consortium was developed five years ago as a result of a need for nontraditional training opportunities that would enable teachers to earn additional certification. Initiators of the program had learned that teachers were expressing an interest in obtaining additional certification, either to change their area of teaching or to protect themselves in case of cutbacks. Teachers who had explored the available options were deterred by what they saw as "roadblocks" in the traditional route.

The consortium, which includes Salem College, Wake Forest University, Winston-Salem State University, the Winston-Salem/Forsyth County Schools, and the North Carolina Department of Public Instruction, is designed to initiate and provide teacher recertification programs. Member institutions in the consortium work to prepare teachers in nine certification areas including math education (grades 6-9 and 9-12) and science education (grades 6-9 and 9-12).

All certified and employed teachers in Forsyth County are eligible for the program. The gifted and talented program has received the most inquiries. When a teacher is admitted to the program, he or she is assisted in designing an individualized development plan.

Courses are competency-based and may be taken at any one of the three IHEs in the consortium. Field experience is provided through a practicum for teachers who are becoming certified in an area in which they were not previously teaching. The practicum, which is often conducted in the summer, includes observation of experienced teachers in the new field. Participants are observed and evaluated prior to recertification.

Fifty-two participants have been recertified through the program. A number of participants have reportedly dropped out because they needed "more structure."

Participants are responsible for their own tuition costs.

9. The Capital Region Earth Science Institute of Virginia Commonwealth University

The Capital Region Earth Science Institute of Virginia Commonwealth University (VCU) is currently in its second year of operation. The retraining program, conducted at VCU, is funded through the Virginia Department of Education. Sixty students are currently participating in the program, which provides certification in earth and space science.

Any currently employed public school teacher is eligible to apply to the program. Teachers certified in a nonscience secondary field or in early childhood or elementary education are required to take 24 semester hours of earth and space science, including at least one course in each of the following fields: biology, chemistry or physics, and mathematics. Eighteen semester hours of earth and space science are required for teachers who are currently certified in science. Participants must also take a one credit earth science teaching seminar (expenses paid) that includes involvement at a state or national science conference.

There is no cost to participants. Virginia Commonwealth University receives $90 per credit hour from the state. This amount covers tuition, books, and field trips for each participant.

10. Math and Science Education Network University of North Carolina at Chapel Hill

The Math and Science Education Network was initiated in 1983 as an extension of a pilot program at the University of North Carolina at Chapel Hill designed to address the shortage of certified mathematics and science teachers. The program is targeted at "out-of-field" teachers wanting to retrain for science and math and at remedial teachers.

In the first year, two centers served 150 teachers. In 1984-85, eight new centers were added and served 2,700. The network estimated that it would

train over 5,000 participants in 1985-86. Participating universities include North Carolina Agricultural and Technical College, UNC-Greensboro, Appalachian State University, UNC-Chapel Hill, UNC-Charlotte, East Carolina State University, Fayetteville State University, NC State University, School of Science and Math, Western Carolina University, and UNC-Wilmington. Each center has a director and a local advisory/planning committee with membership from educational, scientific, industrial, and governmental communities.

The Centers operate inservice programs which include formal graduate or undergraduate credit for academic coursework focusing on subject matter content in mathematics and science and teaching methodology; conferences, seminars, and symposia; and workshops and summer institutes. Current projects deal with technology transfer, materials development, basic research, and application of research.

APPENDIX D

ANNOTATED BIBLIOGRAPHY

ANNOTATED BIBLIOGRAPHY

A. The Quality and Quantity of Math and Science Teachers

Aldridge, B. G. (1984, December). Why NSTA should certify science teachers. The Science Teacher, 20-23.

According to the executive director of the National Science Teachers' Association, half of the newly employed science teachers in 1982 were judged unqualified by their principals. He claims that the lack of qualified science teachers is due to low demand and low state certification requirements for science teachers in specific subject areas--resulting in an enrollment reduction in science education programs.

A number of states offer "broadfield certification" which allows individuals to teach in more than one science discipline. Aldridge argues that broadly certified teachers take positions from fully certified teachers, especially in small schools.

He suggests that NSTA set the standards for science teacher certification and encourages states to adopt them. The standards would encompass five issue areas: science content preparation; science teaching methods preparation; field experiences; professional orientation; and adequacy of preparatory institutions.

American Association for the Advancement of Science (1971). Guidelines and standards for the education of secondary school teachers of science and mathematics. Washington, DC: author.

Due to the extensive changes in mathematics and science curricula which have occured in the last two decades, the American Association for the Advancement of Science (AAAS), in cooperation with the National Association of State Directors of Teacher Education and Certification (NASDTEC), designed new guidelines for the preparation of high school science and math teachers. They are specifically designed to address the needs of science and mathematics faculties; professional education faculties; school and college administrative personnel--state, regional, and local; professional organizations; and the National Council for Accreditation of Teacher Education. The following guidelines encompass the AAAS's belief that teacher education programs should:

1) provide experiences that foster continuous growth in those human qualities of the teacher that will enhance learning by students;

2) prepare teachers to illustrate the cultural significance of science, to relate science and mathematics to social conditions, and to apply the analytic aspects of science to a multidisciplinary approach to studying societal problems;

3) provide opportunities for prospective teachers to enhance the intellectual and philosophical understanding of science and mathematics;

4) require prospective teachers to attain minimum levels of competency in varied fields of science and technology and a high level of competency in their teaching specialities;

5) ensure that science teachers attain minimal mathematical competencies;

6) include a mathematics major for prospective secondary school mathematics teachers;

7) include substantial experience in computing for prospective secondary school mathematics teachers;

8) provide substantial experience with mathematical model building for prospective secondary school mathematics teachers to enable them to recognize and construct mathematical models;

9) provide prospective science and math teachers with experiences that force them to seek out and synthesize new information;

10 provide experiences that will enable the prospective teacher to "learn about the nature of learning, conditions that help young people learn, and how to maintain a proper learning environment;"

11) train prospective teachers to select, adapt, evaluate and develop strategies and materials for use in teaching mathematics or science--which will be appropriate for both the special needs of the learners and special characteristics of the discipline; and

12) develop the capacity for continuing education in science and mathematics.

American Association of Colleges for Teacher Education (1985, May-June). Alternative certification: A position statement of AACTE. Journal of Teacher Education, 36(3), 24.

This paper suggests that emergency certification was an unsuccessful method of alternative teacher preparation in the 1960s and is an inappropriate response to the current teacher shortage. The AACTE contends that states should continue to certify teachers based on a common set of standards. It recommends the following for (alternative) teacher preparation programs: 1) selective admission standards; 2) a curriculum that provides knowledge and skills essential to a beginning teacher; 3) a supervised internship; and 4) a competency exam.

American Association of Colleges for Teacher Education (1985). Teacher education policy in the states: 50-state survey of legislative and administrative actions. Washington, DC: author.

This report provides a brief description of teacher education policy in all fifty states based on the results of a survey conducted by the AACTE Combined Task Force on Governmental Relations. Topics include: standards; incentives; alternative certification; program curricula; research/data/evaluation; faculty development; resources for practitioner inservice; state awareness of equity issues as illustrated by changes in teacher education policy; and capacity building for schools, colleges and departments of education.

Berliner, D. C. (1985). Critical needs in teacher education. Journal of Industrial Teacher Education, 22(4), 5-11.

The author cites his concern that the trend to drop educational methods courses in an effort to expand the teaching force is detrimental. He contends that teacher education programs need to be revitalized, not ignored.

Blank, R. K. (1986). Teacher quality in science and mathematics education: Recommendations for research from a National Research Council conference. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

The author outlines the findings of the National Research Council conference which convened to define teacher quality in mathematics and science education, address the implications of different models for improving teacher quality, and examine the state of research on teacher quality. The conference determined that further research should be encouraged in the following areas: 1) recruitment and selection of teachers; 2) subject matter proficiency of teachers; 3) development of teaching skills; 4) effects of teaching practices; 5) conditions fostering quality teaching; and 6) societal issues related to teacher quality in science and mathematics.

Book, C., Freeman, D., & Brousseau, B. (1985, May-June). Comparing academic backgrounds and career aspirations of education and non-education majors. Journal of Teacher Education, 36(3), 27-30.

The authors conducted a study comparing the academic and social backgrounds of prospective teachers and nonteachers. Based on their limited sample, (drawn from the student body at Michigan State University), they determined that there was not a substantial difference between individuals planning to teach and those who were not. This argument was used to refute the common conclusion that those college graduates most likely to enter and be committed to teaching are drawn from those most likely to score lower on the

SAT. In comparing the social and academic backgrounds of education and noneducation majors at a major university, it was discovered that education majors are as academically competent as students in other disciplines. They are also more concerned about helping people and less concerned about salaries.

Bray, J. L., Flakus-Mosqueda, P., Palaich, R. M., & Wilkins, J. S. (1985). New directions for state teacher policies. Denver, CO: Education Commission of the States.

This report describes state programs that provide innovative techniques for improving the teaching profession, with emphasis on recruitment, recognition, reward, and renewal. It also provides a state-by-state survey of teacher policies pertaining to preservice, inservice training, and the induction of new teachers.

Carnegie Forum on Education and the Economy (1986). A nation prepared: Teachers for the 21st century. The report of the Task Force on Teaching as a Profession. New York, NY: Carnegie Corporation.

This report was produced by the Carnegie Task Force on Teaching as a Profession to address the concern that improved standards in education are necessary to allow the United States to compete in the world economy and that the teaching profession must be "prepared to assume new powers and responsibilities to redesign schools for the future," in order to achieve that goal.

The report argues that in order to address these concerns increased standards for education are required, beginning with increased standards for the teaching profession. The Task Force recommends: 1) creating a National Board for Professional Teaching Standards; 2) restructuring schools to provide a professional environment; 3) restructuring the teaching force; 4) developing a new "professional curriculum" for graduate schools of education leading to a Master in Teaching degree; 5) preparing minorities for teaching; 6) linking teacher incentives to schoolwide student performance; and 7) making teachers' salaries competitive with other professions.

Changing course: A 50-state survey of reform measures (1985, February 6). Education Week, pp. 11-30.

This special report summarizes initiatives for reform activities in the 50 states. It is based on statewide policy documents and interviews with gubernatorial, education-department, budget, and legislative officials in each state. Teacher training and certification reforms are cited for each state.

Coley, R. J., & Thorpe, M. E. (1986). A look at the MAT model of teacher education and its graduates: Lessons for today. Princeton, NJ: Educational Testing Service.

The study was designed to describe a group of MAT programs to teacher educators and other policymakers. The results are based on a survey of MAT graduates from nine institutions of higher education. The report describes:

- the characteristics of the MAT programs and the students they attracted;
- what attracted the students to the program;
- the characteristics of MAT training and how graduates evaluate it;
- the current occupations of MAT graduates, and their occupations since graduation;
- factors that influence MAT graduates' decisions to enter and remain in the teaching field;
- how MAT holders in the teaching population compare with other teachers; and
- the career plans of MAT students.

Coley, R. J. and Thorpe, M. E. (1985). Responding to the crisis in math and science teaching: Four initiatives. Princeton, NJ: Division of Education Policy Research and Services, Educational Testing Service.

The study describes the curriculum and students of four "nontraditional" math and science teacher education programs including: the Harvard Graduate School of Education Midcareer Math and Science Program; the University of Massachusetts/Amherst's Math/Science/Technology Education Project; the University of Vermont's Teacher Preparation Program for Professional Engineers, Scientists, and Mathematicians; and Washington University's Post-A.B. Certification Program.

The description of each program includes a discussion of the characteristics that make it nontraditional, characteristics of the students participating in the program, discussion on what attracted the students to the program, student evaluations of programs, the career plans and motivations of students, and recommendations for designing programs to attract students like themselves.

Commission on the Education of Teachers of Mathematics (1985). Guidelines for the preparation of teachers of mathematics. Reston, VA: National Council of Teachers of Mathematics.

This report was prepared for colleges and universities, the National Council for the Accreditation of Teacher Education, and other agencies involved in teacher accreditation, to present guidelines for the preparation of mathematics teachers. The guidelines focus on knowledge and competence in mathematics at all grade levels; teaching and learning theory; competence and utilization of faculty and faculty involvement with schools; admission to basic programs and evaluation of graduates; library materials and instructional media center; evaluation; review; and long-range planning.

Cornett, Lynn M. (1983). Preparation programs and certification standards for teachers of science and mathematics in the SREB region. Atlanta, GA: Southern Regional Education Board.

The report details the certification requirements and course content for mathematics and science teachers among states within the SREB region. It also outlines and recommends standards set by the National Science Teachers Association and the National Council of Teachers of Mathematics concerning certification.

Council for Basic Education (1986, February). The widespread abuse of out-of-field teaching. Education Digest, 36-39.

Misassignment of teachers "constitutes a scandal in the making for the entire profession," according to this article. Conclusions are drawn from a survey, conducted by the Council for Basic Education, of all state education departments. The report challenges federal, state, and local officials to consider the consequences of out-of-field teaching.

Darling-Hammond, L. (1984, July). Beyond the commission reports, the coming crisis in teaching. Santa Monica, CA: The Rand Corporation.

The report advocates changes in the training and recruitment of teachers in order to prevent a decline in the quality of the teaching force. It examines the trends that have provoked this problem and suggests that "professionalizing" teaching is the best solution.

Erekson, T.L., & Barr, L. (1985, May-June). Alternative credentialing: Lessons from vocational education. Journal of Teacher Education, 36(3), 16-19.

Alternative certification in vocational education has been practiced for years. However, many agree that teachers with nontraditional certificates are not as effective as those with regular certification. The article examines the effectiveness of private sector specialists as teachers in vocational education classrooms and questions the quality of their performance. Inservice programs have been designed to help alleviate the problem.

Evertson, C. M., Hawley, W. D., & Zlotnik, M. (1984). The characteristics of effective teacher preparation programs: A review of research. Nashville, TN: Vanderbilt University, Peabody College.

The report synthesizes research on the characteristics of effective university and college-based programs for educating prospective teachers. Research reviewed is based on the following topics: can teacher preparation programs train teachers to teach effectively? can teacher education programs teach instructional strategies? who should be admitted to teacher education programs? who should be taught? who should be allowed to teach? and what responsibility should teacher education programs have for the induction period of student learning? The authors conclude that more and better research is necessary to improve the teaching profession.

Evertson, C. M., Hawley, W. D., & Zlotnik, M. (1985, May-June). Making a difference in educational quality through teacher education. Journal of Teacher Education, 36(3), 3-12.

This article addresses the debate regarding whether schools of education provide sufficient training for prospective teachers. It provides background on a number of variables involved in an education curriculum and concludes that prospective teachers enrolled in formal preservice preparation programs are more likely to be effective than those who do not have such training.

Feistritzer, C. E. (1985). The condition of teaching: A state by state analysis, Princeton, NJ: The Carnegie Foundation for the Advancement of Teaching.

This 1985 report provides an updated analysis of the original 1983 version of The Condition of Teaching. It focuses primarily on the teaching profession and addresses both demographic issues, such as the number and projected shortages of public school teachers in comparison to increasing enrollments, and the general "status" of the profession--which is described in terms of salaries, descriptions of who is going into teaching, and requirements for teacher education and certification.

Feistritzer, C. E. (1986). Profile of teachers in the U.S., Washington, DC: National Center for Education Information.

This report presents a profile of America's school teachers. It is based on the results of a nationwide survey in which 1,592 teachers participated by responding to a questionnaire which examined how they viewed themselves. The results of the study include:

- teachers are generally satisfied with their jobs;
- although teachers complain about low salaries, they generally do well in comparison with full-time, year-round workers;
- the majority (69% in public schools and 76% in private schools) of teachers are women;
- most teachers are not working for the money;
- teachers would prefer to work nine months at lower salaries than on an annual basis;
- a larger percentage of public school teachers belong to unions as opposed to a small number of private school teachers;
- teachers favor performance-based pay and entry-level certification examinations;
- public and private school teachers have differing concepts concerning the primary role of education--public school teachers tend to be more pragmatic, while private school teachers are more concerned with philosophical questions;
- minority enrollments in both public and private schools greatly exceed the number of minority faculty;
- most teachers have completed five or more years of college; and
- teachers consider themselves politically moderate to liberal; however, the majority voted for Ronald Reagan in 1984.

Flakus-Mosqueda, P. (1983). Working paper no. 2: Survey of states' teacher policies. Denver, CO: Education Governance Center, Education Commission of the States.

This survey was conducted in response to recent reports and attention paid to the teaching profession. State policies are divided into the following categories: standards that states set for teacher training programs; types of teacher training programs; requirements for initial and advanced certification and staff development activities; and illustrations of teacher shortages.

Galambos, E. C., Cornett, L. M., & Spitler, H. D. (1985). An Analysis of transcripts of teachers and arts and sciences graduates. Atlanta, GA: Southern Regional Education Board.

This study compares the academic backgrounds of teachers, differentiating between coursework in the arts and sciences and pedagogical methods. The study concludes that teachers, on the whole, earned fewer "general education" credits than other arts and sciences graduates and took fewer upper level courses.

Galambos, E. C. (1985). Teacher preparation: The anatomy of a college degree. Atlanta, GA: Southern Regional Education Board.

This report is the result of an evaluation of how teachers are currently being prepared. The results of a comparison between the transcripts of education and arts and sciences majors are presented to address the "problems" in teacher education. They point out that teacher education majors generally take a weaker general education curriculum and that most teacher education courses are specifically geared for their discipline and not part of the general arts and sciences course offering. The report suggests that teachers should be required to follow a "regular" arts and sciences curriculum, because, "when general education is strengthened, it is likely to result in improved pedagogy courses too."

Galambos, E. C., & Cornett, L. M. (1984). Do state regulations encourage inclusion of academic discipline courses in the graduate work teachers pursue to fulfill recertification requirements? Unpublished report presented to the Teacher Education Subcommittee of the Council of Southern Graduate Schools.

The study presents the state recertification requirements for every state in the SREB's jurisdiction and determines that there is little emphasis on academic discipline in the regulations, although some states specify that coursework be in the area of specialization. A description of various programs intended to attract liberal arts graduates into the teaching profession is also provided.

Good, T. L., & Hinkel, G. M. (1983). Teacher shortage in science and mathematics: Myths, realities, and research. A summary of a conference sponsored by the National Institute of Education, Washington, DC.

The Improvement of Science and Mathematics Education team of the National Institute of Education was established to examine the shortage of certified and qualified science and math teachers. It conducted a conference in February 1983 to examine the major facets of the math and science teacher shortage. This report provides a summary of the issues discussed at the conference. Data presented indicated that: 43 states reported shortages of

physics teachers, and 35 reported shortages in math and chemistry. Students majoring in education had lower college entrance scores and GPAs than those in other academic areas; and there is a lack of public support and understanding of mathematics and science. The report concludes that the shortage of qualified mathematics and science teachers is an important problem that merits immediate expenditures and action. Areas for action include more and better qualified teachers and improved curricula, textbooks, instructional theories, and procedures for making mathematics and science more meaningful.

Hawk, P. P., Coble, C. R., & Swanson, M. (1985, May-June). Certification: It does matter. Journal of Teacher Education, 36(3), 13-15.

This report examines differences between certified and noncertified mathematics teachers at the middle school and high school levels, based on student achievement, teacher knowledge of subject matter, and teacher professional skills as observed in classrooms. The authors posed three questions: 1) is there a difference in student achievement among students who are taught by certified teachers with endorsements and those without; 2) is there a difference in knowledge of math among teachers with and without appropriate endorsement; and 3) is there a difference in the professional skills of teachers with and without appropriate endorsement?

The results of the study indicate that teachers with appropriate endorsements know more mathematics and show evidence of using more effective teaching practices than their out-of-field counterparts. Most important, students of in-field certified math teachers achieve at a higher level than students taught by out-of-field teachers.

Hazlett, J. S. (1984, Fall). Alternative certification. Contemporary Education, 56(1), 46-47.

The author states that teacher education should be reformed rather than disregarded. Attention must be given to the profession itself before the discipline can be modified. Areas for improvement include salaries, working conditions, and teacher control over curriculum. Efforts at establishing alternative certification plans should be directed at improving current education programs.

Howe, T. G., & Gerlovich, J. A. (1982). National study of the estimated supply and demand of secondary science and mathematics teachers. Des Moines, IA; Department of Public Instruction, and Ames, IA: Iowa State University.

This report, which examines the variables which determine teacher supply and demand, is based on both a statewide (Iowa) and nationwide study of the supply and demand for secondary science and math teachers. In Iowa, it was determined that the supply of math and science teachers, based on the number

of certified graduates, is declining; that competition in hiring from the private sector has changed the job market because prospective math and science teachers are attracted by higher salaried jobs; that there are critical shortages of mathematics and science (general science, earth science, physics, and chemistry) teachers; and that the long-range consequences of the shortages can become very serious if many math and science courses are taught by less qualified teachers.

Nationwide, it was concluded that supply and demand are highly correlated and are both determined by external forces, such as the economic conditions of the country. The current number of certified teacher education graduates will not meet the present or predicted need.

Jacullo-Noto, J. (1985). Teacher certification in transition: Is the profession at risk? Paper presented for the Institute of Research on Teaching, Michigan State University.

The author addresses the problems posed by alternative certification and questions whether it is an effective way of producing skilled, experienced teachers. Four approaches to alternative certification are examined in this report: the career ladder, the New Jersey Alternate Route Plan, mentor teacher programs, and recertification programs.

The report concludes that the following questions must be answered in order to determine the credibility of an alternative certification program: 1) Does early, persistent assessment of teachers insure high quality teachers in the profession? 2) Does one approach to teacher preparation (external or internal) result in more effective teaching? 3) Does intervention by use of a mentor program in the induction period result in better teacher attendance and the long-term retention of teachers? 4) Do increased hours of practicum experience, solo or in concert with a mentor, result in better and more effective acquisition of teaching skills? 5) What types of linkages will occur and persist between schools and institutions of higher education as a result of alternative credentialing plans?"

McGeever, J. M. (1985). Retraining programs to alleviate teacher shortages in mathematics and science. Charleston, WV: Appalachia Educational Laboratory.

A study conducted by the Appalachia Educational Laboratory, Inc. indicates that the shortage of math and science teachers will be most evident at the secondary level. States are using two major strategies to alleviate the problem: financial incentives and new training or retraining. Over half of the states have implemented retraining programs. Some are operated by institutions of higher education and others by LEAs. Successful programs are based upon identified needs in the school districts and designed to continue as long as the need remains. Success is also dependent upon the effectiveness of the program coordinator who is responsible for selecting capable trainers and trainees and coordinating practices.

McLaughlin, J. H. (1979). Pilot survey of teacher and supervisor selection procedures in fifty-four states and possessions of the United States. New York, NY: Research and Development Unit, Board of Education of the City of New York.

This report details the results of a survey, conducted by the Board of Examiners, Board of Education of the City of New York, to determine which states and localities use tests in order to select teachers, administrators, and school supervisors.

- 30 systems reported no testing
- 6 systems reported no testing or the use of self tests prepared by professional testing agencies
- 4 systems reported the use of self tests prepared by professional testing agencies
- 3 systems reported lack of a test monitoring procedure
- 3 systems reported no testing combined with a lack of a test monitoring procedure

(Note: The results are based on an incomplete sample.)

National Commission for Excellence in Teacher Education (1985). A call for change in teacher education. Washington, DC: American Association of Colleges for Teacher Education.

The National Commission for Excellence in Teacher Education, which includes 17 education practitioners and public officials, prepared this report in response to A Nation at Risk. The report focuses on supply and demand issues, the content of teacher education programs, accountability for teacher education, resource requirements for teacher education programs, and conditions necessary to support the highest quality of teaching.

The report suggests that every aspect of teacher education can be improved: "even the best programs are not good enough." It also states that institutions of higher education should increase their commitments to preparing teachers and strengthening the connections between colleges and schools.

The Commission affirms that education is primarily a state, not a federal, function.

National Science Foundation, Office of Scientific and Engineering Personnel and Education (1982). Science and engineering education: Data and information. Washington, DC: National Science Foundation.

This reference report provides information pertaining to resources, participation, test data, degree data, attitudes, goals, needs, and employment in science and engineering. It is intended to serve as a "baseline" about the status of the science and engineering professions.

Oliver, B., & McKibbin, M. (1985, May-June). Teacher trainees: Alternative credentialing in California. Journal of Teacher Education, 36(3), 20-23.

The teacher trainee program was established in California as part of Senate Bill 813, which was designed as a comprehensive education reform. It places specially selected teachers in local school districts for two to three years and allows the state to issue certification credentials as it would issue certificates to applicants who completed traditional programs.

Eligibility for a teacher trainee certificate requires that the candidate possess a bachelor's degree; pass the California Basic Educational Skills Test; and pass a state-approved subject matter skills test. The local district must verify to the SEA that fully credentialed teachers are not available, create and implement a professional development plan for trainees, consult with an accredited institution of higher education regarding professional development plans, and assure that each teacher trainee is assisted and guided by a certified mentor teacher.

Posamentier, A. S., & Stepelman, J. (1982, October). A shortage of mathematics teachers in New York City. Mathematics Teachers, 75, 588-590.

In the last 10 years, the number of college students majoring in mathematics has declined relative to the increase in computer science majors. A large number of math majors are choosing not to enter teaching, as well. The result has been a growing shortage of certified mathematics teachers in New York City schools. In order to compensate, teachers licensed in subjects other than math are assigned to teach math classes.

The authors propose some measures to help ease the shortage of mathematics teachers. They include:

1) A $2,000 stipend for mathematics teachers;
2) Development of programs to encourage college students to major in mathematics;
3) Creation of part-time math positions;
4) Government sponsored low-interest loans for college students preparing to teach math;
5) Government- and industry-sponsored grants;
6) Joint appointments between school systems and industry;
7) 12-month contracts for math teachers;
8) Federal and state-sponsored grants to provide tax relief for math teachers; and
9) Removal of nonteaching duties.

Press, F. (1982, June). The fate of school science. Science, 216 (4550).

This article discusses initiatives designed to deal with the "erosion in precollege teaching of mathematics and science," as viewed by experts in the field. For example, the North Carolina School of Science and Mathematics, located in Durham, is open to all qualified students at no cost. Florida and California are reversing their lax graduation requirements and requiring a minimum of three years of mathematics and two years of science. Also, Houston Independent School District is providing a $2,000 salary supplement to some science and math teachers.

The article states that these initiatives are an important way to help assure the "scientific literacy" of Americans.

Raizen, S. A. (1986). Estimates of teacher demand and supply and related policy issues. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

This paper focuses on incentives to increase the supply of qualified teachers. First, however, it discusses the problems associated with supply and demand studies. The author states that a serious problem associated with estimates of teacher demand is that aggregate estimates ignore disparities among districts and localities. Demand forecasts are also based on current conditions and rarely take projected changes into account.

Supply studies are also subject to uncertainty. Projections rarely include in-migration from other areas. More emphasis should also be placed on qualified versus less qualified teachers. Finally, supply and demand should be analyzed in terms of functions rather than numbers, and forecasts should be based on conditional estimates.

Among the policies instituted to increase the supply of qualified teachers, the author focuses on economic incentives such as scholarship/loan programs, raising salaries, and performance-based pay or career ladders; and changes in credentialing and educational requirements including revision of state certification requirements, competency testing, and reforms in teacher education programs. These policies often address the symptoms of the problem yet have not provided a comprehensive solution.

The paper concludes that structural and cultural changes are needed in order to reverse the trend in teacher supply and that changes based on economic or credentialing incentives will not alleviate the long-term effects of the problem.

Romberg, T. A., & Carpenter, T. P. (1986). Research on teaching and learning mathematics: Two disciplines of science inquiry. Handbook of research on teaching. Third edition. Wittrock, M.C., ed. New York, NY: McMillan Publishing Company.

The authors of this chapter state that until recently, research on teaching and instruction did not pertain to mathematics. Currently, however, studies have begun to provide information that could influence mathematics instruction. This chapter focuses on the current state of instruction in mathematics and how recent research on children's learning has influenced it. The report concludes with a discussion of the direction the authors recommend for future research pertaining to mathematics education, providing seven suggestions for future inquiry: 1) the scope of research on students' learning must be expanded; 2) teaching research should consider how learning proceeds; 3) models bridging the learning-teaching gap need to be constructed; 4) mathematical content should be seriously included in such models; 5) the role of computers and technology must be considered; 6) new assessment tools must be developed; and 7) there is a need to establish research programs.

Shulman, L. S., & Sykes, G. (1986). A national board for teaching? In search of the bold standard. New York, NY: Carnegie Task Force on Teaching and the Economy, Carnegie Corporation.

This report discusses the possibility of the development of a professional board of standards and examinations designed to assess teachers. After describing the desired characteristics of the teaching profession, the authors argue in favor of a national board to assess teachers and lay out the criteria to which the profession should adhere.

Shymansky, J. A., & Aldridge, B. G. (1982, November). The Teacher crisis in secondary science and mathematics. Educational Leadership, 40, 61-62.

This article is frequently cited in discussions of math and science teacher shortages. It states that a critical shortage of science and mathematics teachers at the secondary level is the focal point of the country's problems in science and engineering education.

The results of the study are based on a survey of teacher placement offices, teachers, and administrators that assessed the supply and demand for secondary mathematics and science teachers. The results indicate that from 1971 to 1980 there was a serious decline in the number of individuals pursuing teaching degrees in mathematics (a 79 percent decline) and science (64 percent). A similar decline occured among prepared teachers who chose not to accept teaching positions.

The results of the survey, sent to 1,000 secondary school administrators, indicate that in 1981-82 nearly half the newly employed science and math teachers were unqualified and hired on an emergency basis.

A survey of 450 teachers shows that cuts are being made in their lab and supply budgets and that the majority have not completed a continuing education workshop in over 10 years. Twenty-four percent indicated plans to seek employment outside education within the next five years.

Based on the results of his study, Shymansky concludes that the continued shortage of both qualified and motivated science and mathematics teachers will cause the nation's classrooms to deteriorate further, and that we cannot wait for the laws of supply and demand to reverse the trend.

Southern Regional Education Board (1984). Alternative certification for teachers: 1984 state actions. Atlanta, GA: author.

This paper presents 1984 legislative efforts in alternative certification among states within the Southern Regional Education Board's jurisdiction.

Southern Regional Education Board (1984). Certifying arts and sciences graduates to teach. Atlanta, GA: author.

This paper presents 1984 state initiatives for developing alternative certification routes aimed at liberal arts graduates.

Southern Regional Education Board (1986). Serious shortages of science and mathematics teachers: What SREB states are doing about them. Atlanta, GA: author.

This report details intiatives that SREB states are undertaking in order to address the teacher shortage problem through loans and scholarships, alternative certification, and retraining programs. It states that although the SREB has little empirical evidence on the teacher shortage, it may be covered up because few states know how many nonscience and nonmathematics teachers are teaching in those areas. The report does note that math and science teacher enrollments are increasing, although not enough to reverse the recent decline.

Southern Regional Education Board, Commission for Education Quality (1985). Improving teacher education: An agenda for higher education and the schools. Atlanta, GA: author.

This report, compiled by the SREB, Commission for Education Quality, presents recommendations to improve the general education and pedagogy sequence that teachers should complete. It emphasizes increased student recruitment efforts, stricter standards for completion of the core curriculum, a reorganization and consolidation of pedagogical coursework, increased state involvement, alternative forms of certification, and recruitment of minorities.

Tanner, C. K., & Ebers, S. M. (1985, May-June). Factors related to the beginning teacher's successful completion of a competency evaluation. Journal of Teacher Education, 36 (13), 41-44.

Performance-based certification has gained recent attention as a result of efforts to improve the teaching profession. In many states, performance-based testing is being initiated in addition to established certification requirements.

Welch, W. W., & Lawrenz, F. (1982). Characteristics of male and female science teachers. Journal of Research in Science Teaching, 19(7), 587-594.

The authors use multivariate analysis to examine whether there are significant differences between male and female science teachers "on a set of cognitive, affective, and behavioral measures." Based on their results, they determine that the factors that lead individuals to careers as science teachers differ according to gender and environment.

The report indicates that the number of women who choose to enter the science field is small. Female teachers were determined to have higher measures of interest in science and receptiveness to change--focusing on what should be done--while males proved to be more knowledgeable in content area.

Williams, R. T. (1981, December). Beneath the surface of the mathematics teacher shortage. Mathematics Teacher, 74, 691-694.

The author states that the severity of the mathematics teacher shortage is a matter of interpretation, which is based on the time of year (shortages appear to be most prevalent in mid-August when principals and superintendents report vacancies that are not being filled) and the interests of any individual. Some argue that all secondary mathematics courses should be taught by individuals certified in math, which would increase the math teacher shortage. The author recommends that teachers: "1) take a position regarding

the legitimate domain where certified math teachers should be employed; 2) gain an understanding of the legal and policy constraints affecting the hiring and assignment of out-of-field teachers; 3) gain an understanding of the several facets of the supply and demand of certified mathematics teachers; and 4) analyze teaching assignments to determine where the impact of the shortage affects students." Finally, the author encourages teachers to pressure administrators into addressing the problems posed by the shortage.

Yager, R. E., Bybee, R., Gallagher, J. J., & Renner, J. W. (1982). An analysis of the current crisis in the discipline of science education. Journal of Research in Science Teaching, 19(5), 377-395.

The article adresses the "static" state of science education. Apathy, limited budgets and facilities contribute to the "lack of vision and leadership in the profession." The results of this study are based on interviews and a questionnaire sent to science educators from 28 institutions. Beyond a descriptive account of science education programs, the 28 respondents provide suggestions for improving the state of science education. They pertain to administration, research, science content, the establishment of a theory base for science education, and teacher education.

B. Evaluation of Teaching Performance and Socialization into the Profession

Brophy, J., & Good, T. L. (1986). Teacher behavior and student achievement. Handbook of research on teaching. Third edition. Wittrock, M.C., ed. New York, NY: Macmillan.

This chapter of the Third Handbook of Research on Teaching reviews research linking teacher behavior to student achievement. The chapter briefly reviews progress in this research area prior to 1970, describes trends and methodological advances that led to the large field studies of the 1970s, details these studies and their findings, integrates these data with other data linking teaching behavior to student achievement, assesses the power and limits of the data, and discusses current trends and probable future directions. The emphasis is on consistency and replication of findings, not size of correlations.

Findings from the synthesis of studies suggest that student achievement is related to the following factors:

- teachers who emphasize the academic instruction side of their multiple roles in the classroom
- the amount of time allocated to instructional activities
- organization and management of classroom time to allow maximum time for academic instruction

- appropriate expectations for students based on effective diagnosis of and prescription for learning needs
- the amount of time when students and teacher are actively engaged in either small or large groups
- teaching strategies, including questioning techniques, feedback, and monitoring of progress.

The authors emphasize that these factors are suggestive and not definitive, and are influenced by the norms and contexts of learning settings. While the factors should not be categorically employed for teacher evaluation or accountability purposes, they suggest areas of teaching competence that are positively associated with student achievement.

Mathematics and science education may present some particular problems. The authors note: "Research in mathematics and science instruction has shown that many concepts are counterintuitive or otherwise difficult to grasp and retain, not only for students but also for teachers and other adults. Consequently, teachers with limited backgrounds in certain subject matter areas may teach incorrect content or fail to recognize and correct their students' misunderstandings. Clearly, the effectiveness of lessons will vary with teachers' interest in and knowledge about the content being taught."

Darling-Hammond, L., Wise, A. E., & Pease, S. R. (1983, Fall). Teacher evaluation in the organizational context: A review of the literature. Review of Educational Research, 53(3), 285-328.

This review maintains that: 1) teacher evaluation has assumed increasing importance over the last decade, and 2) as in other areas of education, the theory and practice of teacher evaluation diverge.

The article presents a conceptual framework on understanding teacher evaluation in the organizational context. It does not present a review of literature on teacher evaluation techniques, methods, instruments, and processes. However, it refers the reader to these recent compilations: A. Lewis, Evaluating educational personnel, Arlington Virginia: American Association of School Administrators, 1982; J. Millman (Ed.) Handbook of teacher evaluation, Beverly Hills, Calif.: Sage Publications, 1981; Peterson, K. & Kauchak, D. Teacher evaluation: Perspectives, practices, and promises, Salt Lake City: Center for Educational Practice, University of Utah, 1982; R. J. Stiggens and N. J. Bridgeford, Performance assessment of teacher development, Portland, Oregon: Center for Performance Assessment, 1982.

The authors contend that their review of research leads them to hypothesize the following four minimal conditions for the successful operation of a teacher evaluation system:

- All actors in the system have a shared understanding of the criteria and processes for teacher evaluation;

- All actors understand how these criteria and processes relate to the dominant symbols of the organization, that is, there is a shared sense that they capture the most important aspects of teaching and that the evaluation system is consonant with educational goals and conceptions of teaching work;

- Teachers perceive that the evaluation procedure enables and motivates them to improve their performance; and principals perceive that the procedure enables them to provide instructional leadership;

- All actors in the system perceive that the evaluation procedure allows them to strike a balance "between adaptation and adaptability, between stability to handle present demands and flexibility to handle unanticipated demands" (Weick, 1982, p. 674); that is, that the procedure achieves a balance between control and autonomy for the various actors in the system.

Doyle, W. (1986). Classroom organization and management. Handbook of research on teaching. Third edition. Wittrock, M. C., ed. New York, NY: Macmillan.

This chapter summarizes the major lines of research on classroom organization and management with a special emphasis on studies from the 1970s and 1980s. The authors identify the following themes across the studies that can serve as a framework for integration:

1) "Classroom management is fundamentally a process of solving the problem of order in classrooms rather than the problems of misbehavior or student engagement."

2) "Order in classrooms is defined by the strength and durability of action embedded in the activities teachers and students enact together as they accomplish work. This emphasis underscores the dynamic quality of management processes."

3) "A program of action, and thus classroom order is jointly enacted by teachers and students in settings of enormous complexity."

4) "Programs of action in classroom activities are defined by both the roles for social participation and the demands of academic work. For this reason academic work is directly involved in the process of achieving classroom order and can be shaped in basic ways by a teacher's management decisions."

5) "Order in classrooms is context specific and held in place by balancing a large array of forces and processes. . . . Order is not something teachers achieve once and for all so they can get on with the business of instruction. Rather it is a permanent pressure on classroom life, and a teacher continuously faces the need to monitor and protect the programs of action in a class."

6) "The key to a teacher's success in management appears to be his or her (a) understanding of the likely configuration of events in a classroom and (b) skill in monitoring and guiding activities in light of this information. From this perspective, management effectiveness cannot be defined solely in terms of rules for behavior. Effectiveness must also include such cognitive dimensions as comprehension and interpretation, skills which are necessary for recognizing when to act and how to improvise classroom events to meet immediate circumstances." (pp. 423-424)

Millman, J., ed. (1981). Handbook on teacher evaluation. Beverly Hills, CA: Sage Publications, published in cooperation with the National Council on Measurement in Education.

This text is a guidebook for practitioners. One chapter, by Robert Travers, discusses "Criteria of Good Teaching." According to Travers, "No one has as yet identified a set of competencies that can be demonstrated to be related to how much pupils learn. The critics say that the competencies remain mythical entities. Others claim that clearly identifiable forms of teacher behavior in the classroom represent such competencies. The concept of teaching as an assembly of competencies lacks substance at present. It has not led to the development of any defensible and usable set of criteria of teacher effectiveness. The approach has appeal, particularly to those who know little about what has, and has not, been established about the nature of teaching. For the latter reason, it has had political attractiveness and has found some acceptance among some members of state legislatures, who have then brought pressure to bear on state departments of education to apply the concept to teacher certification, teacher evaluation, and teacher education."

Millman concludes with the notion that the word "teaching" refers to a very broad class of activities. The activities that constitute teaching in any particular setting depend upon how the school is organized, the nature of the program, the structure of the curriculum, the teaching materials to be used, the expectations of parents, and the social context of education. A method of evaluating teaching may be appropriate in one setting and not another. Research shows that students can learn in a variety of ways.

The chapter on summative evaluation, written by Michael Scriven, argues that the best teaching is not that which produces the most learning because what is learned may be worthless. Scriven argues that no definition of good teaching avoids a series of counterarguments and counterexamples, but he suggests that the following definition avoids some problems: Teachers are meritorious to the extent that they exert the maximum possible influence

toward beneficial learning on the part of their students, subject to three conditions: 1) the teaching process is ethical; 2) the curriculum coverage and the teaching process are consistent with what has been promised; and 3) the teaching process and its foreseeable effects are consistent with the appropriate institutional and professional goals and obligations. He concludes that personnel evaluation, in general, is a field that needs attention.

Nemser, S. F. (1983). Learning to teach. Handbook of teaching and policy. Shulman, L., & Sykes, G., eds. New York, NY: Longman, Inc.

This chapter focuses on how teachers learn to teach in relation to how they are taught. It is organized chronologically around the four phases of learning to teach--pretraining, preservice, the induction phase that coincides with the first year, and the inservice phase that covers the rest of the teacher's career.

Nemser makes these points about the induction phase:

1) The first year is characterized by the shock of reality.

2) The process of learning during this phase is trial and error--for survival purposes.

3) The problems of beginning teachers include: establishing classroom control; reluctance to assume the role of classroom leader; uncertainty about what to teach and how; lack of experience in how to predict student response; and lack of clarity about how to evaluate students and communicate with parents.

4) The sources of these problems can be inadequate preparation, lack of organization, lack of support, and the personality of the individual.

Russell, D., & Hunter, M. (1976). Planning for effective instruction. Expanded in: Hunter, M. (1982). Mastery teaching. El Segundo, CA: TIP Publications.

This strategy for planning and instruction has been widely accepted by SEAs and LEAs.

The authors maintain that before a teacher begins to plan for a particular day's teaching, he or she should take the following steps that make effective instruction possible: 1) within each general content area, determine the particular strand for immediate diagnosing and teaching; 2) identify a major target objective in that strand and locate students' knowledge or skill in relation to that objective; and 3) on the basis of the diagnosis, select the specific objective for a particular group's daily instruction.

After making these preliminary plans, the teacher must consider seven further steps separately to determine whether or not each is appropriate for the particular objective and for these students, and whether it should be included, excluded, or combined with a subsequent step. If the step is included, how to effectively integrate it into an artistic "flow" of instruction is the essence of the planning task. The authors conclude that teachers must know the suggested steps and implement them with artistry. "Both the science and the art of teaching are essential."

Ryan, K., Newman, K., Mager, G., Applegate, J., Lasley, T., Flora, R., Johnston, J. (1980). Biting the apple. New York, NY: Longman, Inc.

This is a collection of twelve accounts of individual teachers making their way through teaching in their first year. The authors, all teacher educators, were guided by the following questions: 1) What are the first year teacher's perceptions of himself or herself? 2) What are the first year teacher's perceptions of himself or herself as a teacher? 3) What happens in the classroom and elsewhere in the school that the new teacher perceives as successes and failures? 4) What are the new teacher's perceptions of students, administrators, fellow teachers, teacher educators, and parents? and 5) How do these perceptions change over the year?

The overarching message is that while student teaching helps to prepare one for the realities of the classroom, there is an enormous difference between student teaching and the first year.

Major reasons for first year difficulties include: 1) the multiple nonteaching adjustments that new teachers often must make; 2) false expectations about what teaching entails; 3) assignments in subject areas for which the teachers are not fully prepared; and 4) the physically and emotionally draining nature of teaching.

Ryan reviews some of the relevant literature about first year teaching experience. He divides the literature into five categories: advice on the first year of teaching; reports of first year teachers' experiences; scholarly essays on the first year of teaching; reflective interpretations of the first year teachers' experiences; and empirical studies of the first year of teaching.

One NIE report (Vaughn, 1978) concluded that the first year is a crucial one in the career of the teacher. The conditions under which a person carries out the first year of teaching have a strong influence on the level of effectiveness the teacher is able to sustain over the years, on the attitudes that govern teacher behavior over even a forty-year career, and on the decision whether or not to continue in the teaching profession.

Tom, A. R. (1984). Teaching as a moral craft. New York, NY: Longman, Inc.

Tom argues that the effective teacher is not necessarily "the one who has been programmed with researched-based prescriptions for various teaching problems. . . . . Rather, the effective teacher may be the one who is able to conceive of his teaching in purposeful terms, analyze a particular teaching problem, choose a teaching approach, judge the results in relation to the original purpose, and reconsider either the teaching approach or the original purpose." This conception of teaching effectiveness is strongly normative and situational. Ultimately, Tom concludes that teaching is a moral craft. By moral Tom means "both a concern for the rightness of conduct and a broader concern for what is deemed important or valuable, provided that these valuational situations clearly entail desirable ends." In the teacher-student relationship, the teacher has control over developing the student in desirable directions, that is, enhancing competence and extending independence. By accepting the obligation to foster these desirable outcomes the teacher assumes moral responsibility for the student. The scientific approach to teaching, which involves the search for the set of effective behaviors, makes little sense in the conception of teaching as a moral craft.

Zumwalt, K. K. (1986). Rethinking school improvement: Research, craft and concept. New York, NY: Teachers College Press.

Zumwalt, a teacher educator and a recent mother, focuses on the similarities faced by beginning mothers and teachers as they cope with new experiences, the differences in the induction process highlighted by comparing new teachers and new mothers, and implications of the similarities and differences for the induction of teachers. Her conclusions include:

1) There is no one right way in teaching or mothering. The right way evolves as one applies a good dose of personality, intuition, common sense, past experience, and values, along with the accumulated knowledge and skill offered by professionals.

2) Teaching is more than a repertoire of knowledge, skills, and attitudes that the teacher brings to bear in an effort to create certain changes in learners. The technological view of teaching, which underlies many conceptions of teaching, fails to capture the educational dynamics and demands that face the new teacher. Teaching entails applying the tools of the trade in a fast-paced, continuous, complex, problem-solving and decision-making process.

3) A key problem of teacher education programs is that the emphasis is on how to learn how to teach rather than on how to learn from teaching. New teachers need time to learn gradually from the experience as mothers do.